THE

SILVA OF NORTH AMERICA

BY

CHARLES SPRAGUE SARGENT

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THE

SILVA OF NORTH AMERICA

A DESCRIPTION OF THE TREES WHICH GROW NATURALLY IN NORTH AMERICA EXCLUSIVE OF MEXICO

BY

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Illustrated with Figures and Analyses drawn from Nature

BY

CHARLES EDWARD FAXON

SUPPLEMENT

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To

THE TRUSTEES OF THE MASSACHUSETTS SOCIETY
FOR THE PROMOTION OF AGRICULTURE

THIS THIRTEENTH VOLUME OF

THE SILVA OF NORTH AMERICA

IS AFFECTIONATELY DEDICATED

BY THEIR ASSOCIATE OF THIRTY YEARS.

NOTE.

THE first volume of this work was issued in October, 1890. At that time it was believed that the forests of North America, exclusive of Mexico, contained only 422 species of trees and that these could be described in twelve volumes illustrated by 600 plates.

The interest in trees and dendrological study have greatly increased in the United States since the first volumes of this Silva appeared; and recent researches have disclosed the presence on this continent of a number of arborescent species whose existence was not even suspected ten years ago, and have added much to the knowledge of the geographical distribution of North American trees. Most of these additions to our silva are new to science; others were formerly considered shrubs but are now known to be often arborescent in habit, and others regarded as varieties in earlier volumes are now believed to be best treated as species. Two supplementary volumes are needed for the description and illustration of these additions, and the completed work contains the descriptions of 585 trees, of several varieties of trees and of a number of shrubs, and 740 plates.

C. S. SARGENT.

ARNOLD ARBORETUM,
June, 1902.

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CEANOTHUS SPINOSUS.

Lilac.

BRANCHLETS angled, spinescent. Inflorescence compound, on leafy branches. Leaves coriaceous, rarely 3-nerved, persistent.

Ceanothus spinosus, Nuttall, *Torrey & Gray Fl. N. Am.* i. 267 (1838). — Watson, *Proc. Am. Acad.* x. 337. — Brewer & Watson, *Bot. Cal.* i. 103. — Trelease, *Proc. Cal. Acad.* ser. 2, i. 109; *Gray Syn. Fl. N. Am.* i. pt. i. 411. — Parry, *Proc. Davenport Acad.* v. 172. — Greene, *Garden and Forest*, v. 447. — K. Brandegee, *Proc. Cal. Acad.* ser. 2, iv. 185 (excl. var. *Palmeri*).

Usually shrubby in habit, *Ceanothus spinosus* in the cañons of the San Rafael Mountains sometimes becomes a shapely tree, eighteen or twenty feet in height, with a stem five or six inches in diameter covered with dark red-brown bark roughened by small closely appressed scales, and upright branches forming an narrow open head. The branchlets are slender, divaricate, angled, pubescent or puberulous when they first appear, soon glabrous, bright green, ultimately reddish brown, and frequently end in sharp leafless thorn-like points. The leaves are elliptical, full and rounded and apiculate or often slightly emarginate or gradually narrowed and pointed or rarely three-lobed at the apex, rounded or cuneate at the base, villose-pubescent below when they first unfold along the stout midribs and obscure primary veins, soon glabrous, coriaceous, and persistent; they are usually about an inch long and half an inch wide, and are borne on stout petioles which vary from one sixth to one third of an inch in length and, at first villose, finally become nearly glabrous. On vigorous shoots the leaves are sometimes ovate, conspicuously three-nerved, irregularly serrate, with incurved apiculate teeth, or coarsely dentate, and often an inch and a half long and five eighths of an inch wide. The stipules are minute, acute, and early deciduous. The flowers, which vary from light to dark blue and are very fragrant, open from March until May, and are produced in lax corymbs from the axils of acute pubescent red caducous bracts on upper leafy branchlets of the year, the whole inflorescence forming an open thyrsus often five or six inches long and three or four inches thick and destitute of leaves toward the apex. The fruit is depressed, obscurely lobed, crestless, black, and from one quarter to one third of an inch in diameter.

Ceanothus spinosus is a common inhabitant of mountain cañons near the coast of southern California in Santa Barbara, Ventura, and Los Angeles counties, where it grows down nearly to the sea-level in forests composed of *Quercus agrifolia*, *Platanus racemosa*, *Sambucus glauca*, *Umbellularia Californica*, *Alnus rhombifolia*, *Juglans Californica*, and often forms a heavy undergrowth with other small trees and many species of shrubs, its large clusters of bright blue flowers enlivening these forests for many weeks in early spring, when it is one of the most beautiful of all the members of this genus.[1]

Ceanothus spinosus was discovered in 1836 by Thomas Nuttall,[2] near Santa Barbara, California.[3]

[1] There appears to be no record of the introduction of *Ceanothus spinosus* into American or European gardens.

[2] See ii. 34.

[3] See Coville, *Proc. Biol. Soc. Washington*, xiii. 117.

EXPLANATION OF THE PLATE.

PLATE DCXXI. CEANOTHUS SPINOSUS.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A fruiting branch, natural size.
4. Vertical section of a fruit, enlarged.
5. A nutlet divided transversely, enlarged.

C.E. Faxon del.

Rapine sc

CEANOTHUS SPINOSUS, Nutt.

A. Riocreux direx.t

Imp. J. Taneur, Paris

ÆSCULUS AUSTRINA.

Buckeye.

PETALS shorter than the stamens. Leaves 5-foliolate. Seeds pale yellow-brown.

Æsculus austrina, Small, *Bull. Torrey Bot. Club*, xxviii. 359 (1901).

Æsculus Pavia, β discolor, Torrey & Gray, *Fl. N. Am.* i. 252 (in part) (not *Æsculus discolor*, Pursh) (1838).

Æsculus octandra, var. **hybrida**, Sargent, *Silva N. Am.* ii. 60 (in part) (1891). — Robinson, *Gray Syn. Fl. N. Am.* i. pt. i. 447 (in part).

A tree, occasionally twenty-five or thirty feet in height, with a straight trunk five or six inches in diameter covered with pale smooth bark, and rather stout branches forming a narrow symmetrical head; or often shrubby. The branchlets, which are unusually slender for those of a Horsechestnut, are marked by numerous small pale lenticels, and when they first unfold are green and puberulous, becoming gray slightly tinged with red during their first winter and only slightly darker in their second year. The winter-buds are broadly ovate, obtusely pointed, and about a quarter of an inch in length, with ovate rounded apiculate light red-brown outer scales. The leaves are generally composed of five leaflets,[1] and are borne on slender grooved villose or pubescent usually ultimately glabrous petioles from three to five inches long. The leaflets are oblong-obovate or elliptical, acuminate at the apex, gradually narrowed from near the middle and acute at the entire base, finely or coarsely and sometimes doubly crenulate-serrate above, dark green, lustrous, and glabrous, except along the slender yellow midribs and veins, on the upper surface, lighter colored and coated on the lower surface, early in the season at least, with soft pale pubescence, nearly sessile or petiolulate, from four to five inches long and from an inch and a half to two inches wide. The flowers appear in southern Arkansas from the first to the middle of April,[2] and are usually from three quarters of an inch to an inch in length, and bright red; they are borne on slender pubescent pedicels which become much thickened on the fruit and are sometimes a quarter of an inch long, and are mostly aggregated toward the ends of the short branches of the narrow pubescent inflorescence which varies from six to eight inches in length. The calyx is tubular, short and broad or elongated, puberulous on the outer surface and tomentose on the inner surface, with rounded lobes. The petals are connivent, unequal, oblong-obovate, rounded at the apex, puberulous on the outer surface, and glandular, with minute dark glands, those of the superior pair being about half as wide as those of the lateral pair, with claws much longer than the calyx. The filaments, which are longer than the petals, and the ovary are villose. The fruit ripens and falls in October, and is borne on the much elongated thickened and now drooping rachis of the inflorescence, usually only a few fruits maturing. These are usually pear-shaped or occasionally subglobose, mostly two-seeded, and generally from an inch and a half to two inches and a half in length, with very thin pale brown slightly pitted valves. The seeds are sometimes an inch and a half in diameter, light yellow-brown, with a small hilum and a thin testa.[3]

[1] On a specimen of Æsculus collected by B. F. Bush at Columbia, Texas, April 5, 1901 (No. 48), which should probably be referred to this species, the leaves all have six or seven leaflets.

[2] At Fulton, Arkansas, where this red-flowered Horsechestnut is in bloom from the first to the middle of April, I found on the 23d of April, 1891, Horsechestnut-trees with leaves just beginning to unfold and minute flower-buds. The under surface of the leaflets of these trees was coated with thick silvery white tomentum similar to that found on the young leaflets of the shrubby Horsechestnut of western Texas, with which *Æsculus austrina* is now provisionally united.

[3] It is with considerable hesitation and without having seen the type of *Æsculus austrina* that I adopt this name for a common Horsechestnut of the trans-Mississippi region, for too little is still known about it and about some other peculiar forms of Æsculus of the same region, especially those of eastern Texas, where fruit has not yet been collected. *Æsculus austrina* approaches on the one hand *Æsculus octandra*, var. *hybrida*, with which it has previously

Æsculus austrina grows in rich upland woods from Memphis, Tennessee,[1] and southern Missouri[2] to eastern Texas[3] and northwestern Alabama.[4]

been united, in the color of the flowers, in the short broad calyx of some individuals, and in the pubescence which covers the under surface of the leaflets, differing from the Appalachian tree in its exserted stamens. On the other hand, it approaches *Æsculus Pavia* in the long narrow calyx of some individuals and in the exserted filaments, differing from it in its pubescent leaflets and more numerous and crowded flowers. From all the American species, with the exception of *Æsculus parviflora*, it differs in the color of its light yellow-brown seeds, which furnish the best character for distinguishing this tree.

[1] A. Fendler, April 13, 1851 (in Herb. Gray).

[2] Butler County, G. W. Letterman, May 9, 1884. This specimen has the long tubular calyx of *Æsculus Pavia*, but the leaves are very pubescent. Neeleysville, Butler County, B. F. Bush, April 22, 1898; Grandin, B. F. Bush, May 6, 1901, with only slightly pubescent leaflets and a long tubular calyx. Arkansas: Camden, A. Fendler, 1850; Little Rock, G. W. Letterman, May 6, 1881; Fulton, B. F. Bush, April 4, 1900; W. M. Canby, B. F. Bush, and C. S. Sargent, April 18, 1901.

[3] Rio Guadaloupe, Berlandier, April, 1828 (Nos. 1743 and 422, in Herb. Gray); near Boerne, C. S. Sargent, March, 1887; Columbia, B. F. Bush, April 5, 1901 (No. 48).

[4] A specimen collected in 1854, at Moulton, Lawrence County, Alabama, and preserved in the Gray Herbarium, appears identical with *Æsculus austrina* from southern Arkansas, except in its smaller leaflets.

EXPLANATION OF THE PLATE.

PLATE DCXXII. ÆSCULUS AUSTRINA.

1. A flowering branch, natural size.
2. An upper petal, natural size.
3. A lateral petal, natural size.
4. A stamen, natural size.
5. The end of a cluster of fruit, natural size.
6. A nut, natural size.

C.E.Faxon del. *Lartaud sc.*

ÆSCULUS AUSTRINA, Small.

A.Riocreux direx.t *Imp. J.Taneur, Paris.*

SAPINDUS MARGINATUS.

Soapberry.

SEPALS rounded; petals appendiculate. Fruit dorsally carinate. Leaflets 7 to 13, lance-oblong.

Sapindus marginatus, Willdenow, *Enum.* 432 (1809). — Muehlenberg, *Cat.* 41. — De Candolle, *Prodr.* i. 607. — Sprengel, *Syst.* ii. 250. — Don, *Gen. Syst.* i. 665. — Spach, *Hist. Vég.* iii. 54. — Torrey & Gray, *Fl. N. Am.* i. 255 (in part). — Nuttall, *Sylva*, ii. 72, t. 65. — Engelmann & Gray, *Jour. Bost. Soc. Nat. Hist.* v. 241 (*Pl. Lindheim.* i.) (in part). — Gray, *Gen. Ill.* ii. 214 (in part). — Schnizlein, *Icon.* t. 230, f. 22. — Chapman, *Fl.* 79. — Hemsley, *Bot. Biol. Am. Cent.* i. 214 (in part). — Sargent, *Forest Trees N. Am.* 10*th Census U. S.* ix. 44 (in part); *Silva N. Am.* ii. 71 (in part). — Robinson, *Gray Syn. Fl. N. Am.* i. pt. i. 444.

Sapindus Saponaria, Lamarck, *Ill.* ii. 441, t. 307 (not Linnæus) (1793). — Michaux, *Fl. Bor.-Am.* i. 242. — Poiret, *Lamarck Dict.* vi. 663 (in part). — Persoon, *Syn.* i. 444. — Pursh, *Fl. Am. Sept.* i. 274. — Nuttall, *Gen.* i. 257. — Elliott, *Sk.* i. 460.

Sapindus falcatus, Rafinesque, *Med. Fl.* ii. 261 (1830).

Sapindus acuminatus, Rafinesque, *New Fl.* iii. 22 (1836). — Radlkofer, *Sitz. Akad. Münch.* 1878, 316, 393. — Watson & Coulter, *Gray's Man.* ed. 6, 116 (in part).

Sapindus Manatensis, Radlkofer, *Sitz. Akad. Münch.* 1878, 318, 400. — Nash, *Bull. Torrey Bot. Club*, xxiii. 102.

A tree, rarely more than twenty-five or thirty feet in height, with a trunk sometimes a foot in diameter, and stout pale brown or ultimately ashy gray branchlets. The leaves are six or seven inches long, with from seven to thirteen leaflets which are borne on a slender wingless or narrowly margined or marginless rachis, the lower leaflets being usually alternate and the upper opposite. The leaflets are lance-oblong, acuminate, more or less falcate, glabrous, dark green and lustrous on the upper surface, paler and glabrous or puberulous below along the slender midnerves, sessile or very short-petiolulate, from two to five inches in length and from three quarters of an inch to an inch and a quarter in width. The panicles of flowers, which appear in early spring, are pyramidal, four or five inches long and usually about three inches wide, with villose stems and branches. The flowers, which are borne on short stout tomentose pedicels, are more or less tinged with red and are nearly an eighth of an inch in diameter. The sepals are villose on the outer surface toward the base and ciliate on the margins, the outer being rounded at the narrowed apex and much narrower than the inner, which are obovate and rounded at the broad apex. The petals are ovate-oblong, short-clawed, ciliate on the margins, and furnished on the inner surface near the base with a two-lobed villose scale. The berries are conspicuously keeled on the back, short-oblong, and often three quarters of an inch in length, with thin light yellow translucent flesh and obovate dark brown seeds villose at the hilum with tufted pale hairs.[1]

[1] In the *Synoptical Flora of North America* (i. pt. i. 444 [1897]), Dr. B. L. Robinson first pointed out the characters which separate *Sapindus marginatus* of Florida from the Sapindus of the region west of the Mississippi River, for which the name of *Sapindus Drummondi* must be adopted. In the second volume of *The Silva of North America* the Texas tree was confounded with the Florida species, and the description of *Sapindus marginatus*, including that of the wood, was largely drawn up from the former, which is figured on plates lxxvi. and lxxvii. of this work.

From *Sapindus marginatus* the trans-Mississippi species can be distinguished by its wingless rachis, more numerous and narrower lanceolate leaflets, which vary from eight to nineteen in number and are pubescent or ultimately glabrate on the lower surface; by its rhombic-lanceolate unguiculate petals and smaller berries, which are globose, destitute of the dorsal keel which distinguishes those of *Sapindus marginatus*, and in drying turn black.

The range of *Sapindus Drummondi*, as laid down in the description of *Sapindus marginatus* in volume ii., can now be extended northward to southwestern Missouri, where this tree is abundant on the Cowshed River, near Pineyville, McDonald County, and on White River in Barry County, and to central Kansas. (See Hitchcock, *The Industrialist*, xxiv. 387 [*Flora of Kansas*].) *Sapindus Drummondi* was discovered in 1819 by Thomas Nuttall during his journey to Arkansas.

The corrected synonymy of *Sapindus Drummondi* is, —

Sapindus Drummondi, Hooker & Arnott, *Bot. Voy. Beechey*, 281 (1838?). — Walpers, *Rep.* i. 417. — Robinson, *Gray Syn. Fl. N. Am.* i. pt. i. 444. — Britton, *Man.* 610.

Sapindus marginatus inhabits the coast of Florida from the mouth of the St. John's River and Cedar Keys southward.[1]

Sapindus Saponaria, Torrey, *Ann. Lyc. N. Y.* ii. 172 (not Linnæus) (1827).

Sapindus marginatus, Torrey & Gray, *Fl. N. Am.* i. 255 (in part) (not Willdenow) (1838); *Pacific R. R. Rep.* ii. 162. — Engelmann & Gray, *Jour. Bost. Soc. Nat. Hist.* v. 241 (*Pl. Lindheim.* i.). — Gray, *Gen. Ill.* ii. 214 (in part), t. 180; *Jour. Bost. Soc. Nat. Hist.* vi. 168 (*Pl. Lindheim.* ii.); *Smithsonian Contrib.* iii. 38 (*Pl. Wright.* i.). — Engelmann, *Wislizenus Memoir of a Tour to Northern Mexico* (*Senate Doc.* 1848, Bot. Appx.), 96. — Torrey, *Emory's Rep.* 138; *Marcy's Rep.* 250; *Pacific R. R. Rep.* iv. pt. v. 74; *Bot. Mex. Bound. Surv.* 47. — J. M. Bigelow, *Pacific R. R. Rep.* iv. pt. v. 2. — Hemsley, *Bot. Biol. Am. Cent.* i. 214 (in part). — Watson, *Proc. Am. Acad.* xvii. 337. — Sargent, *Forest Trees N. Am.* 10*th Census U. S.* ix. 44 (in part); *Silva N. Am.* ii. 71 (in part), t. 76, 77. — Havard, *Proc. U. S. Nat. Mus.* viii. 508. — Britton & Brown, *Ill. Fl.* ii. 402 (in part), f. 2386.

Sapindus acuminatus, Watson & Coulter, *Gray's Man.* ed. 6, 116 (in part) (not Rafinesque) (1890).

[1] Knowledge of the range of *Sapindus marginatus*, which is probably everywhere a rare tree, is still unsatisfactory. It is not now known to grow north of the mouth of the St. John's River in Florida, although it was once believed to inhabit the coast of South Carolina and Georgia, where the elder Michaux is said to have discovered this tree.

EXPLANATION OF THE PLATE.

Plate DCXXIII. Sapindus marginatus.

1. A flowering branch, natural size.
2. A flower-bud, enlarged.
3. Vertical section of a flower, enlarged.
4. An outer sepal, enlarged.
5. An inner sepal, enlarged.
6. A petal, inner face, enlarged.
7. A stamen, enlarged.
8. A pistil, enlarged.
9. A fruiting branch, natural size.
10. Vertical section of a fruit, natural size.
11. A seed, natural size.

C.E.Faxon del

Rapine sc

SAPINDUS MARGINATUS, Willd.

A.Riocreux direx.t

Imp. J.Taneur, Paris

ACER SACCHARUM, var. LEUCODERME.

Sugar Maple.

LEAVES 3 to 5-lobed, yellow-green and pubescent on the lower surface.

Acer Saccharum, var. leucoderme.

Acer barbatum, var. **Floridanum**, Sargent, *Silva N. Am.* ii. 100 (in part) (1891).

Acer Floridanum, var. **acuminatum**, Trelease, *Rep. Missouri Bot. Gard.* v. 99, t. 11 (not *Acer acuminatum*, Wallich) (1894).

Acer leucoderme, Small, *Bull. Torrey Bot. Club*, xxii. 367 (1895) ; xxiv. 64. — Robinson, *Gray Syn. Fl. N. Am.* i. pt. i. 440. — Mohr, *Contrib. U. S. Nat. Herb.* vi. 606 (*Plant Life of Alabama*). — Gattinger, *Fl. Tennessee*, 116.

A tree, usually from twenty to twenty-five feet in height, with a trunk a foot in diameter, but occasionally attaining a height of forty feet and forming a trunk eighteen or twenty inches in diameter, and with a rather compact round-topped head of comparatively short and slender branches. The bark on the trunk of old individuals, particularly near the ground, is dark brown or often nearly black, and broken by deep furrows into narrow ridges covered with closely appressed scales, but on younger stems and on the large branches it is close and light gray or grayish brown. The branchlets are slender and glabrous ; dark green when they first appear, they become bright red-brown and lustrous during their first summer, when they are marked by numerous small oblong pale lenticels, and, gradually growing darker in their second year, finally become light gray-brown. The winter-buds are ovate, acute, dark brown, glabrous, and rarely more than a sixteenth of an inch in length, with accrescent inner scales which are bright crimson and very conspicuous when the trees are in flower in early spring. The leaves are borne on elongated slender glabrous petioles and vary from two inches to three inches and a half in diameter ; they are usually truncate or slightly subcordate at the base, and more or less deeply divided into from three to five acute lobes which are caudate-acuminate and coarsely and sinuately dentate or undulate ; coated below as they unfold with long matted pale caducous hairs, at maturity the leaves are thin, dark dull green above and bright yellow-green and coated below with soft close velvety pubescence. In the autumn the leaves often turn bright scarlet on the upper surface before falling. The flowers are produced on slender glabrous pedicels, and are glabrous or slightly villose and rather smaller than those of the northern Sugar Maple. The carpels of the fruit are villose until nearly grown, with long scattered pale hairs, but are glabrous at maturity ; their wings are wide-spreading or divergent.

Acer Saccharum, var. *leucoderme* inhabits the banks of streams and rocky gorges, and is distributed from the valley of the Yadkin River in Stanly County, North Carolina, to northern Georgia, eastern Tennessee, central Alabama, western Louisiana, and southern Arkansas. It was long confounded with the variety *Floridanum* of the Sugar Maple, from which it chiefly differs in the yellow-green lower surface of the rather thinner leaves and in their less prominent secondary lobes.[1]

[1] *Acer barbatum* of Michaux was adopted in the second volume of this work as the name of the Sugar Maple and its varieties. *Acer barbatum*, however, appears to have been based originally on two species, for Michaux's type of his *Acer barbatum*, preserved at the Muséum d'Histoire Naturelle, in Paris, consists of flowering branches of the Sugar Maple, a branch of the Red Maple with leaves only, and a branch with fruit of the Red Maple ; and the name, therefore, can hardly be used for the Sugar Maple. The older *Acer Saccharum* of Marshall (*Arbust. Am.* 4) has recently been almost universally adopted by American botanists as the name of the Sugar Maple, and although the identity of Marshall's species is certainly open to doubt, and the name is not distinct enough from that of the Silver Maple, the *Acer saccharinum* of Linnæus, to really justify its use, it will perhaps be best, for the sake of uniformity of nomenclature, to adopt Marshall's name rather than to find another for the Sugar Maple. If this view is adopted, *Acer barbatum*, Sargent, *Silva N. Am.* ii. 97, becomes *Acer Saccharum*, Marshall ; *Acer barbatum*, var. *Floridanum*, Sargent, becomes *Acer Saccharum*, var.

Acer Saccharum, var. *leucoderme* has been planted, with other forms of the Sugar Maple, along the streets of Rome, Georgia, where there are now many large and handsome specimens of this tree.

Floridanum, Sargent; and *Acer barbatum*, var. *grandidentatum*, Sargent, becomes *Acer Saccharum*, var. *grandidentatum*, Sargent.

In the second volume of this work a form of the Sugar Maple with somewhat coriaceous leaves of firm texture, usually rather broader than long, pale or glaucous and pubescent or rarely glabrous below, cordate, with a broad open sinus, or truncate at the base, and usually three-lobed with open round sinuses and acuminate generally nearly entire lobes, was confounded with the Black Sugar Maple, and figures 1–3 of plate xci. of this work represent this form and not the Black Maple. The synonymy of this form is as follows: —

Acer Saccharum, var. *Rugelii*, Rehder, *Cyclopædia Am. Hort.* i. 13 (1900).

Acer saccharinum, Schmidt, *Oestr. Baumz.* i. 12, t. 8 (not Linnæus nor Wangenheim) (1792). — Elliott, *Sk.* i. 450.

? Acer nigrum, Elliott, *l. c.* (not Michaux f.) (1817).

Acer saccharinum, var. *glaucum*, Pax, *Engler Bot. Jahrb.* vii. 242 (in part) (1886).

Acer Rugelii, Pax, *l. c.* 243 (1886). — Schwerin, *Gartenflora*, xlii. 457.

Acer palmifolium, var. *nigrum*, Schwerin, *l. c.* 456, f. 95, No. 4 (1893).

Acer saccharinum, subspec. *saccharinum*, var. *glaucum*, Wesmael, *Bull. Soc. Bot. Belg.* xxix. 61 (in part) (*Gen. Acer*) (1890).

Acer saccharinum, subspec. *Rugelii*, Wesmael, *l. c.* (1890).

Acer saccharinum, var. *nigrum*, Newhall, *Trees of N. E. Am.* 152 (in part), f. 76 (1890).

Acer barbatum, var. *nigrum*, Sargent, *Silva N. Am.* ii. 99 (in part), t. 91, f. 1–3 (1891).

Acer Saccharum, var. *barbatum*, Trelease, *Rep. Missouri Bot. Gard.* v. 94, t. 6 (not *Acer barbatum*, Michaux) (1894). — Robinson, *Gray Syn. Fl. N. Am.* i. pt. i. 439. — Chapman, *Fl.* ed. 3, 87.

This is the common and frequently the only form of the Sugar Maple in the region from North Carolina and Georgia to Missouri, and although rare at the north, trees with leaves like those of the southern tree occur as far north as Michigan and Prince Edward's Island, and, as Professor Beal has pointed out, such leaves sometimes appear on the upper branches of trees which bear on their lower branches the typical leaves of the northern Sugar Maple. (See *Rep. Sec. State Board Agric. Michigan*, xxxiii. 148 [*The Sugar Maple of Central Michigan*].)

On the one hand, therefore, *Acer Saccharum*, var. *Rugelii*, passes into the northern *Acer Saccharum*, and on the other some of its forms seem to pass into the variety *Floridanum*, which replaces it from northern Florida to eastern Texas, and which in its turn passes through western Texas into the variety *grandidentatum* of the Rocky Mountain region.

Acer Saccharum, var. *Rugelii*, is the form which is usually cultivated in the southern states, and splendid specimens growing in the streets and gardens of Huntsville, Alabama, and other cities and towns of the southern Piedmont region show that this is one of the most beautiful of all Maple-trees, particularly in autumn, when the leaves assume the most brilliant tints of scarlet and orange.

EXPLANATION OF THE PLATE.

PLATE DCXXIV. ACER SACCHARUM, var. LEUCODERME.

1. A flowering branch, natural size.
2. A staminate flower, enlarged.
3. Vertical section of a staminate flower, enlarged.
4. A pistillate flower, enlarged.
5. Vertical section of a pistillate flower, enlarged.
6. A fruiting branch, natural size.
7. A fruit, natural size.
8. Cross section of a seed, enlarged.
9. An embryo, enlarged.

C.E.Faxon del

D. Jochum sc.

ACER SACCHARUM, var. leucoderme. Sarg.

A.Riocreux direct.

Imp. J.Taneur Paris.

ACER NIGRUM.

Black Maple.

LEAVES 3 to 5-lobed, deeply cordate, the basal sinus often closed, pubescent below, stipulate. Branchlets light orange-colored.

Acer nigrum, Michaux, f. *Hist. Arb. Am.* ii. 238, t. 16 (1812). — Pursh, *Fl. Am. Sept.* i. 266. — Poiret, *Lamarck Dict.* Suppl. v. 669. — Nuttall, *Gen.* i. 253. — De Candolle, *Prodr.* i. 595. — Sprengel, *Syst.* ii. 225. — Don, *Gen. Syst.* i. 650. — Spach, *Hist. Vég.* iii. 104; *Ann. Sci. Nat.* sér. 2, ii. 170. — Dietrich, *Syn.* ii. 1282. — C. Koch, *Dendr.* i. 532. — Bailey, *Popular Gardening*, iii. 24; *Bot. Gazette*, xiii. 213. — Koehne, *Deutsche Dendr.* 382. — Britton & Brown, *Ill. Fl.* ii. 398, f. 2376.

Acer saccharinum, β **nigrum**, Torrey & Gray, *Fl. N. Am.* i. 248 (1838). — Gray, *Man.* 80. — Torrey, *Fl. N.Y.* i. 136. — Loudon, *Arb. Brit.* i. 411. — Sargent, *Forest Trees N. Am.* 10*th Census U. S.* ix. 49. — Watson & Coulter, *Gray's Man.* ed. 6, 117. — Dippel, *Handb. Laubholzk.* ii. 439, f. 206.

Acer saccharinum, var. **glaucum**, Pax, *Engler Bot. Jahrb.* vii. 242 (in part) (1886). — Wesmael, *Bull. Soc. Bot. Belg.* xxix. 61 (*Gen. Acer*) (in part).

Acer Saccharum, var. **nigrum**, Britton, *Trans. N. Y. Acad. Sci.* ix. 9 (1889). — Trelease, *Rep. Missouri Bot. Gard.* v. 96, t. 7. — Robinson, *Gray Syn. Fl. N. Am.* i. pt. i. 439.

Acer barbatum, var. **nigrum**, Sargent, *Garden and Forest*, iv. 148 (1891); *Silva N. Am.* ii. 99 (in part). — Beal, *Rep. State Board Agric. Michigan*, xxxiii. 148, t. 1, f. 8–10, t. 2, f. 4–6, t. 3 (*The Sugar Maple of Central Michigan*).

Acer palmifolium, var. **concolor**, Schwerin, *Gartenflora*, xlii. 457, f. 6, 7 (1893).

The Black Maple is a tree, sometimes eighty feet in height, with a trunk frequently three feet in diameter, and stout spreading or often erect branches. The bark of young trees is close, smooth, and generally rather lighter colored than that of the Sugar Maple of the same age, but on old trunks it becomes deeply furrowed and often nearly black. The branchlets are stout, marked by oblong pale lenticels, and when they first appear are orange-green in color and pilose, with scattered pale caducous hairs; during their first year they are orange or orange-brown and lustrous, and in the following season become pale gray-brown and lose their lustre.[1] The winter-buds are sessile, ovate, acute, and an eighth of an inch long or less, with dark red-brown scales coated on the outer surface with hoary pubescence and often slightly ciliate on the margins. The leaves are cordate, with a broad basal sinus usually more or less closed by the approximation or imbrication of the basal lobes, generally three or occasionally five-lobed with acute or acuminate lobes undulately narrowed from broad shallow sinuses or rarely furnished with short spreading lateral lobes; when they unfold they are coated below with thick hoary tomentum and clothed above with caducous pale hairs, and at maturity they are thick and firm in texture, dull green on the upper surface, yellow-green and soft-pubescent particularly along the yellow veins on the lower surface, and five or six inches across, with drooping sides; they are often conspicuously pendant, and are borne on stout tomentose or pubescent sometimes ultimately glabrous petioles from three to five inches long, much dilated at the base and frequently nearly inclosing the buds, and in falling leave narrow scars which almost encircle the branchlet, and are furnished in their axils with tufts of long pale hairs. The stipules are triangular and dentate or foliaceous, sessile or stipitate, oblong, acute, tomentose or pubescent, sometimes slightly lobed, and frequently an inch and a half in length.[2] In the autumn

[1] The Black Maple differs from the other forms of the Sugar Maple in the light orange-brown color of the young branchlets, those of all the others being bright red-brown and very lustrous, in the presence of stipules and in important leaf characters; and as these appear constant throughout the region occupied by this tree it can perhaps best be separated from the other members of the Sugar Maple group and treated as a species.

[2] Gray, *Am. Nat.* vi. 767; vii. 422. — Sargent, *Garden and Forest*, iv. 148, f. 27.

On the fertile branches found in herbaria the stipules are not

the leaves turn a dull yellow-brown color and fall rather earlier than those of the Sugar Maple. The flowers are produced in many-flowered nearly sessile umbel-like corymbs, the sterile and fertile flowers in separate or in the same clusters on the same or on different trees; they appear with the leaves and are greenish yellow, and droop on slender thread-like hairy pedicels from two and a half to three inches in length. The calyx is broadly campanulate, five-lobed by the partial union of the sepals and pilose on the outer surface toward the base. There are seven or eight stamens with slender glabrous filaments which in the sterile flower are nearly twice as long as the calyx, and in the fertile flower are shorter than the calyx. The ovary, which is minute in the sterile flower, is obtusely lobed, pale green, and covered with long scattered hairs. The fruit is glabrous, with wings varying from one half of an inch to an inch in length, and convergent or wide-spreading.

Acer nigrum is distributed from the valley of the St. Lawrence River in the neighborhood of Montreal [1] southward to the valley of Cold River, New Hampshire,[2] and through western Vermont,[3] and westward through northern New York, Ontario,[4] the southern peninsula of Michigan, Indiana, Illinois, and Iowa, to northeastern South Dakota,[5] western Missouri,[6] and eastern Kansas,[7] and southward through western New York and Pennsylvania to southwestern Virginia [8] and Kentucky. Comparatively rare near Montreal and in Vermont, the Black Maple becomes more abundant farther west, and, growing with the Sugar Maple, it can be distinguished at a glance from that tree in summer by its heavy drooping leaves, which make it a conspicuous object in the forest or by the roadside, and at all seasons of the year by the color of its young branches. In Iowa it almost entirely replaces *Acer Saccharum*, and it is the only Sugar Maple of South Dakota.

The Black Maple was first distinguished by the younger Michaux. It is often cultivated as a shade tree, particularly in those parts of the country where it grows spontaneously.

always present, but they often occur on such branches, and they can always be found on vigorous shoots so far as I have been able to examine them on both cultivated and wild trees.

[1] *Acer nigrum* was collected by Mr. J. G. Jack in August, 1895, at Rockfield, Quebec.

[2] *Acer nigrum* was collected by Mr. M. L. Fernald in the alluvium of Cold River, in Cheshire County, New Hampshire. (See *Rhodora*, iii. 234.)

[3] *Acer nigrum* was collected by Mr. Ezra Brainerd in Middlebury, Vermont, in 1879, and by Miss M. A. Day at Manchester, Vermont, on June 25, 1898. The younger Michaux speaks of having noticed the Black Maple at Windsor, Vermont, on the Connecticut River, but I have seen no specimens from the eastern part of the state.

[4] See Macoun, *Cat. Can. Pl.* i. 99.

[5] In South Dakota *Acer nigrum* grows in Roberts County, where it is abundant in deep ravines along the small streams which form the Little Minnesota. (See D. H. Saunders, *Bull.* 64, *South Dakota Agric. College*, 169 [*Ferns and Flowering Plants of South Dakota*].) In the second volume of this work the range of the Sugar Maple was probably incorrectly extended to eastern Nebraska. Later observation indicates that the Sugar Maples of that state have been planted since the settlement of the region by white men, and that this tree, although reaching South Dakota and Kansas, is not a native of Nebraska. (See Bessey, *Rep. Nebraska State Board Agric.* 1899, 89 [*The Forests and Forest Trees of Nebraska*].)

[6] Near Independence, Missouri, 1894, B. F. Bush (No. 130).

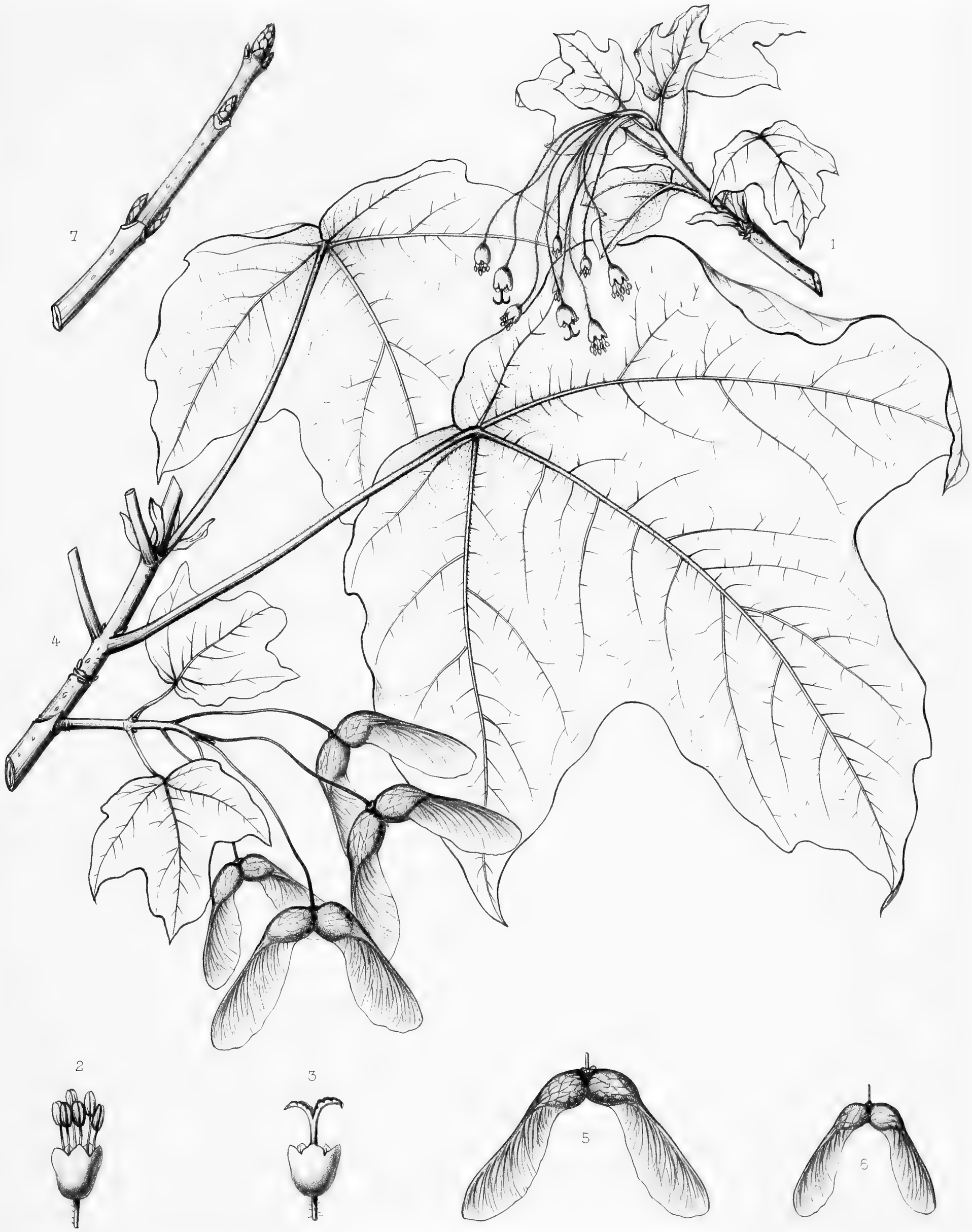
[7] Lawrence, Kansas, J. H. Carruth, 1894.

[8] Falls of the Holston, Smythe County, Virginia, John K. Small, July, 1892. Alleghany Springs, C. Mohr, August 10, 1898.

EXPLANATION OF THE PLATE.

PLATE DCXXV. ACER NIGRUM.

1. A flowering branch, natural size.
2. A staminate flower, enlarged.
3. A pistillate flower, enlarged.
4. A fruiting branch, natural size.
5. A fruit, natural size.
6. A fruit, natural size.
7. A winter branchlet, natural size.



C.E.Faxon del.

Em.Himely sc.

ACER NIGRUM, Michx. l.

A.Riocreux direx.t

Imp. J. Taneur, Paris

ACER RUBRUM, var. TRIDENS.

Red Maple.

LEAVES 3-lobed at the apex, usually rounded at the base.

Acer rubrum, var. **tridens**, Wood, *Class Book*, 286 (1860); *Am. Bot. and Flor.* pt. iv. 74; *Fl. Atlant.* 74.

Acer rubrum, β Torrey & Gray, *Fl. N. Am.* i. 249 (1838).

Acer microphyllum, Pax, *Engler Bot. Jahrb.* vii. 180 (1886).

Acer semiorbiculatum, Pax, *Engler Bot. Jahrb.* vii. 181 (1886).

Acer rubrum, subspec. **semiorbiculatum**, Wesmael, *Bull. Soc. Bot. Belg.* xxix. 29 (*Gen. Acer*) (1890). — Schwerin, *Gartenflora*, xlii. 166, f. 38, No. 4.

Acer rubrum, subspec. **microphyllum**, Wesmael, *Bull. Soc. Bot. Belg.* xxix. 29 (*Gen. Acer*) (1890). — Schwerin, *Gartenflora*, xlii. 167.

Acer rubrum, Chapman, *Fl.* 81 (in part) (1860). — Sargent, *Silva N. Am.* ii. 107 (in part). — Robinson, *Gray Syn. Fl.* i. pt. i. 437 (in part).

In the coast region of the south Atlantic and Gulf states the leaves of the Red Maple differ so much and often so constantly from those which are usually produced by this tree at the north, and which are figured on plate xciv. of this work, that a supplementary plate now seems necessary properly to illustrate this variable species.

On the southern tree, which is generally smaller than the northern Red Maple, the leaves are normally obovate, usually narrowed from above the middle to the rounded or rarely cuneate base, three-lobed at the apex with acute or acuminate lobes which are simple or furnished with short lateral secondary lobes; they are remotely serrate except toward the base, with incurved glandular teeth, and are often ovate by the suppression of the lateral lobes and acute; they are thick and firm in texture, dark green above, very glaucous and usually pubescent or rarely tomentose below, from two to three inches in length and from an inch and a half to two inches and a half in width.[1] The flowers of the southern form are sometimes tawny-yellow in color,[2] and the fruit, which is usually much smaller on this form than on northern trees and on the variety *Drummondii* of the lower Mississippi basin, is rarely also yellow.[3]

Acer rubrum, var. *tridens*, is distributed from southern New Jersey southward through the coast region and the middle districts to southern Florida, and along the Gulf coast to eastern Texas.[4]

[1] Individual leaves, similar in shape to those usually produced on the southern tree, can generally be found on the Red Maple at the north, particularly on the stunted trees which grow in swamps, although the majority of the leaves of this tree at the north are mostly ovate, with broad bases, and from three to five-lobed.

[2] Darlington, *Fl. Cestr.* 245.

[3] In April, 1890, I found at Meridian, Mississippi, a Red Maple with bright canary-yellow fruit.

[4] It was by an error, due to the fact that trees which had been planted were reported as growing naturally in this region, that the range of *Acer rubrum* as laid down on page 108 of the second volume of this work was extended to eastern Nebraska and Dakota. The most western station in this part of the country where the Red Maple is known by me to grow spontaneously is in the valley of the Kickapoo River in western Wisconsin (L. H. Pammel), and in a Tamarack swamp near La Crosse, Iowa, about seven miles from the Mississippi River, where it was found in the summer of 1901 by Professor Pammel.

EXPLANATION OF THE PLATE.

PLATE DCXXVI. ACER RUBRUM, var. TRIDENS.

1. A flowering branch of the staminate tree, natural size.
2. Vertical section of a staminate flower, enlarged.
3. A flowering branch of the pistillate tree, natural size.
4. Vertical section of a pistillate flower, enlarged.
5. A fruiting branch, natural size.
6. Vertical section of a fruit, natural size.
7. End of a sterile branch, natural size.

8, 9, 10. Leaves from one tree, natural size.

C.E. Faxon del. *Lartaud sc.*

ACER RUBRUM VAR. TRIDENS, Wood.

A. Riocreux dirext. *Imp. J. Taneur, Paris.*

GLEDITSIA TEXANA.

Locust.

LEGUME straight, elongated, many-seeded, destitute of pulp, indehiscent. Leaflets oblong-ovate.

Gleditsia Texana, Sargent, *Bot. Gazette*, xxxi. 1 (1901).

A tree, from one hundred to one hundred and twenty feet in height, with a trunk rarely exceeding two feet and a half in diameter covered with pale smooth close bark, and erect slightly spreading branches. The branchlets, which are comparatively slender, more or less zigzag, and roughened by numerous small round lenticels, are light orange-brown when they first appear, gray or orange-brown during their first year, and ashy gray the following season. The leaves are six or seven inches long, with a slender rachis which is at first puberulous but ultimately glabrous, and from twelve to twenty-two leaflets, and often bipinnate usually with six or seven pairs of pinnæ, the lower pairs being frequently reduced to single large leaflets. The leaflets are oblong-ovate, often somewhat falcate, rounded or acute or apiculate at the apex, obliquely rounded at the base, finely crenulate-serrate, thick and firm in texture, dark green and lustrous on the upper surface, pale on the lower surface, and from one half of an inch to an inch in length, with short petiolules coated while young with soft pale hairs, which also occur along the base of the slender orange-colored midnerves. The staminate flowers are dark orange-yellow, and appear toward the end of April in slender glabrous often clustered racemes, which, lengthening after the flowers begin to open, are finally from three to four inches in length. The calyx is campanulate, with acute lobes which are thickened on the margins, villose-pubescent on the two surfaces, and rather shorter and narrower than the puberulous petals. The stamens are exserted, with slender filaments villose near the base, and green anthers. The pistillate flowers are still unknown. The legumes, which are four or five inches long and an inch wide, are straight, much compressed, rounded or short-pointed at the apex, full and rounded at the broad base, thin-walled, dark chestnut-brown, puberulous, only slightly thickened at the margins, many-seeded, and destitute of pulp. The seeds are oval, compressed, dark chestnut-brown, very lustrous, and nearly half an inch in length.[1]

A few individuals only of *Gleditsia Texana* are now known in a single grove on the bottom-lands of the Brazos River, near the town of Brazoria, Texas, where it grows in dense woods composed principally of *Gleditsia triacanthos*, *Platanus occidentalis*, and *Populus deltoidea*. The peculiar pods which distinguish this species were first noticed in February, 1892, by Mr. E. N. Plank,[2] and led to the study of this tree in 1899 and 1900 by Mr. B. F. Bush.

[1] Resembling *Gleditsia triacanthos* in foliage and in the staminate flowers, *Gleditsia Texana* is distinguished from that species by its spineless branches and smoother pale bark. From all species of the genus it differs in the legumes. These resemble those of the many-seeded species in their general form and color and in their numerous seeds; they differ from them in their much smaller size, thin compressed walls, with thinner margins, and in the absence of the sweet pulp which surrounds their thinner lighter-colored seeds. From the compressed pulpless legume of *Gleditsia aquatica* they differ in form and in their much more numerous seeds.

Known only in a single grove, and sharing something of the character of each of the other American species which grow near it, the hypothesis of the hybrid origin of this tree might be considered were it not for the fact that the legumes of *Gleditsia triacanthos* are nearly half grown on the lower Brazos before the flowers of *Gleditsia Texana* open, while the flowers of *Gleditsia aquatica* do not open until ten or twelve days after those of *Gleditsia Texana* have fallen.

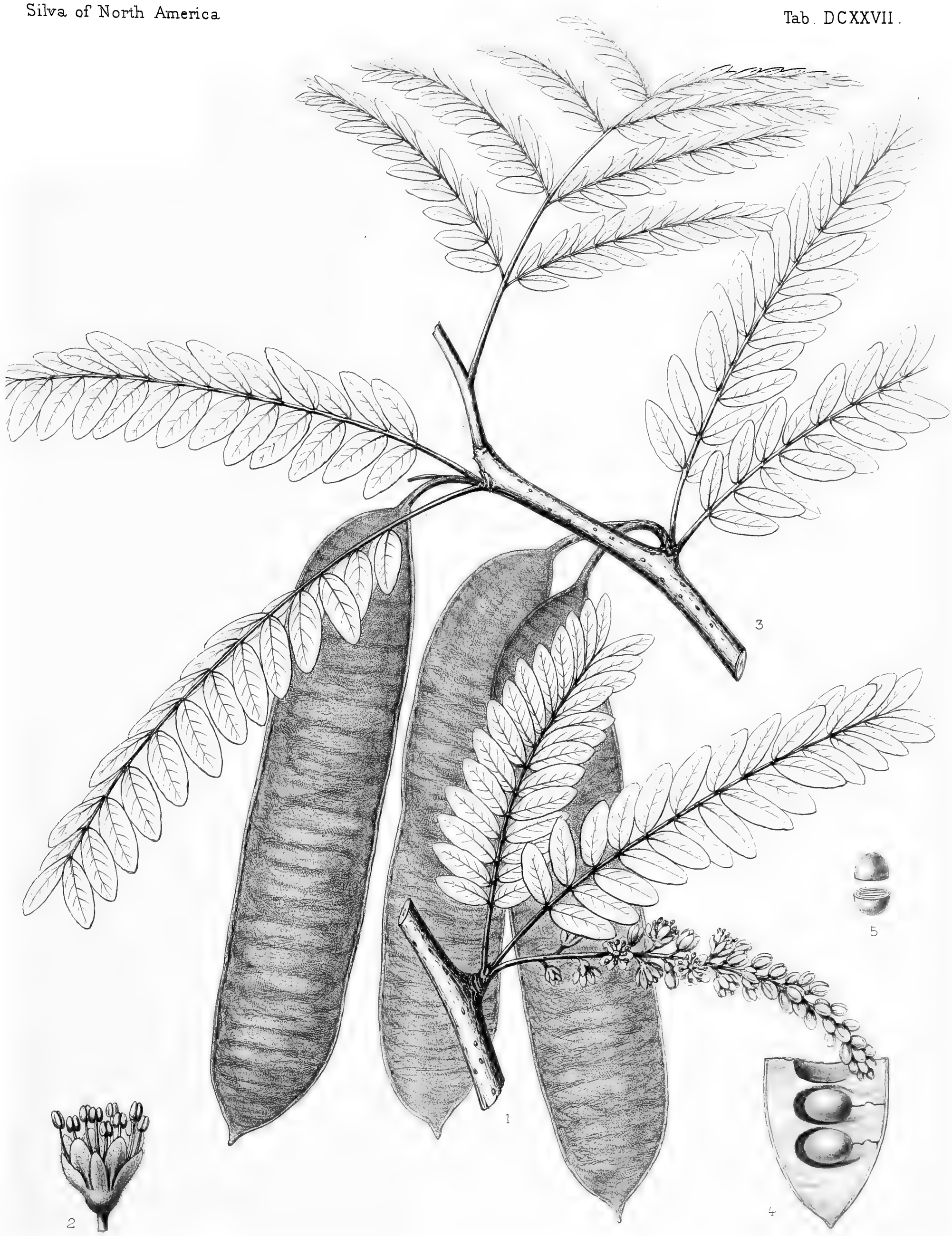
[2] Elisha Newton Plank, a descendant through his father and mother of old New England families which had furnished soldiers to the Continental army, was born on March 23, 1831, in Wolcott, Wayne County, New York, where his grandfather had settled in 1813. Having received an academic education and studied law, he remained in New York until 1879, when he moved with his family to Kansas, where he became a journalist; and then traveled for several years through Kansas and Texas delivering popular and successful lectures on literary and philosophical subjects. During these years he devoted much atten-

tion to botany, in which he had been interested from boyhood, and made large collections of many new and little known plants. From 1892 to 1896 Mr. Plank contributed a long series of important papers on the flora of Texas to *Garden and Forest*, and he is the author of papers on pomology and forestry published in the reports of the Kansas State Horticultural Society, and of a paper on *Buchloë dactyloides*, printed in the nineteenth volume of the *Bulletin of the Torrey Botanical Club*.

EXPLANATION OF THE PLATE.

Plate DCXXVII. Gleditsia Texana.

1. A flowering branch of the staminate tree, natural size.
2. A staminate flower, enlarged.
3. A fruiting branch, natural size.
4. Vertical section of a portion of a legume, natural size.
5. Cross section of a seed, natural size.



C.E. Faxon del

Rapine sc

GLEDITSIA TEXANA, Sarg.

A. Riocreux direx.t

Imp. J. Taneur, Paris

PROSOPIS JULIFLORA, var. VELUTINA.

Mesquite.

LEAFLETS crowded, cinereo-pubescent. Calyx pubescent.

Prosopis juliflora, var. **velutina.**

Algarobia glandulosa, Torrey, *Pacific R. R. Rep.* vii. pt. iii. 10 (not *Ann. Lyc. N. Y.* ii. 192, t. 2) (in part) (1856).

Prosopis juliflora, Torrey, *Bot. Mex. Bound. Surv.* 60 (in part) (not De Candolle) (1859). — Rothrock, *Wheeler's Rep.* vi. 106 (in part). — Sargent, *Silva N. Am.* iii. 101 (in part).

Prosopis velutina, Wooton, *Bull. Torrey Bot. Club*, xxv. 456 (1898).

Prosopis juliflora was first described from trees growing on the island of Jamaica, where it is believed to have been introduced from the mainland before the middle of the eighteenth century. The Mesquite of western Texas,[1] where it is one of the most conspicuous features of vegetation, appears identical with the plant which grows on Jamaica; but eastward and westward the Mesquite diverges from the western Texas plant, and its extreme forms, distinct enough when seen locally, are connected by intermediate forms which make it difficult to find characters by which these can be satisfactorily separated as species. The two extreme forms, however, can be well treated as varieties.

The first of these varieties is the eastern and California tree, *Prosopis juliflora*, var. *glandulosa*.[2] This is the common Mesquite of eastern Texas, where it is frequently a round-topped tree, twenty feet in height, with a trunk a foot in diameter and long gracefully drooping branches forming a symmetrical round-topped head, leaves with distant linear mostly acute glabrous dark green leaflets often two inches in length, and a glabrous calyx.[3] This form ranges westward to about the ninety-eighth meridian, northward into southern Kansas,[4] and southward into northern Mexico,[5] and with rather shorter and more crowded leaflets is common in southern California, extending southward into Lower California.[6]

The second variety, *Prosopis juliflora*, var. *velutina*, is a tree found only in the hot semitropical

[1] *Prosopis juliflora* in western Texas and eastern New Mexico is usually a shrub sending up a number of stout stems from enormous roots, but occasionally becomes a low tree, with a trunk six or eight inches in diameter. The leaves are glabrous, with from fifteen to twenty pairs of leaflets; these are crowded or more or less remote, linear-oblong, rounded or acute at the apex, and from one third to one half of an inch in length. The calyx is glabrous. Leaves and a flower-spike of *Prosopis juliflora* are figured on plate cxxxvi. f. 27 of this work.

On specimens collected along the shore of Corpus Christi Bay in March, 1894, by A. A. Heller, the leaves, with short and comparatively crowded leaflets, are not distinguishable from those of the western Texas *Prosopis juliflora*.

[2] *Prosopis juliflora*, var. *glandulosa*.

Prosopis glandulosa, Torrey, *Ann. Lyc. N. Y.* ii. 192, t. 2 (1828); *Emory's Rep.* 139 (in part). — Don, *Gen. Syst.* ii. 400. — Dietrich, *Syn.* ii. 1424. — Walpers, *Rep.* i. 861. — Bentham, *Hooker Jour. Bot.* iv. 348; *Lond. Jour. Bot.* v. 81.

Algarobia glandulosa, Torrey & Gray, *Fl. N. Am.* i. 399 (1838); *Pacific R. R. Rep.* ii. 164. — Engelmann & Gray, *Jour. Bost. Soc. Nat. Hist.* v. 242 (*Pl. Lindheim.* i.). — Engelmann, *Wislizenus Mem. of a Tour to Northern Mexico* (*Senate Doc.* 1848, Bot. Appx.), 94. — Gray, *Jour. Bost. Soc. Nat. Hist.* vi. 181 (*Pl. Lindheim.* ii.); *Smithsonian Contrib.* iii. 60; v. 51 (*Pl. Wright.* i., ii.); *Ives' Rep.* 11. — Torrey, *Sitgreaves' Rep.* 158; *Bot. Mex. Bound. Surv.* 60 (in part).

[3] The most constant character, perhaps, by which the Texas and California Mesquite can be distinguished from the form of southern Arizona is in the glabrous calyx, for the leaves of this form show great variations; but on a specimen with typical leaves collected by Pope in Texas, without other indication, from the Thurber Herbarium and now in the Gray Herbarium, the flowers and leaflets are tomentose; and on specimens collected by N. A. Carlton in Oldham County, Texas, in 1891, also with leaves of the typical var. *glandulosa*, the calyx is puberulous. These species seem to indicate a transition into the pubescent form of southern Arizona.

[4] The Mesquite was first collected in Kansas in 1880 by Mr. E. N. Plank. See, also, L. F. Ward, *Plant World*, i. 48, and C. N. Gould, *Plant World*, iv. 74, 193.

[5] Near Matamoras, Berlandier (No. 2344 equals 914), 1831, and Gregg, May 10, 1847 (in Herb. Gray); San Luis Potosí, Palmer, 1878; Parras, and near Saltillo, Palmer, 1880; Manzanilla, Palmer, 1890; Monterey, C. K. Dodge, April and May, 1891 (in U. S. Nat. Herb.).

[6] The specimens collected by T. S. Brandegee at San Gregoria in Lower California, February, 1887, and distributed as *Prosopis pubescens*, probably belong to this form.

valleys of southern Arizona and Sonora,[1] where it often attains the height of fifty feet, with a trunk two feet in diameter covered with rough dark brown bark, and with heavy irregularly arranged usually crooked branches. This form grows to a larger size than any of the other Mesquites in the United States. The leaves are five or six inches long, often fascicled and cinereo-pubescent, with short petioles and from twelve to twenty-two pairs of oblong or linear-oblong obtuse or acute pale green leaflets from one quarter to one half of an inch in length, and with densely flowered spikes of flowers two or three inches long. The calyx is villose.[2]

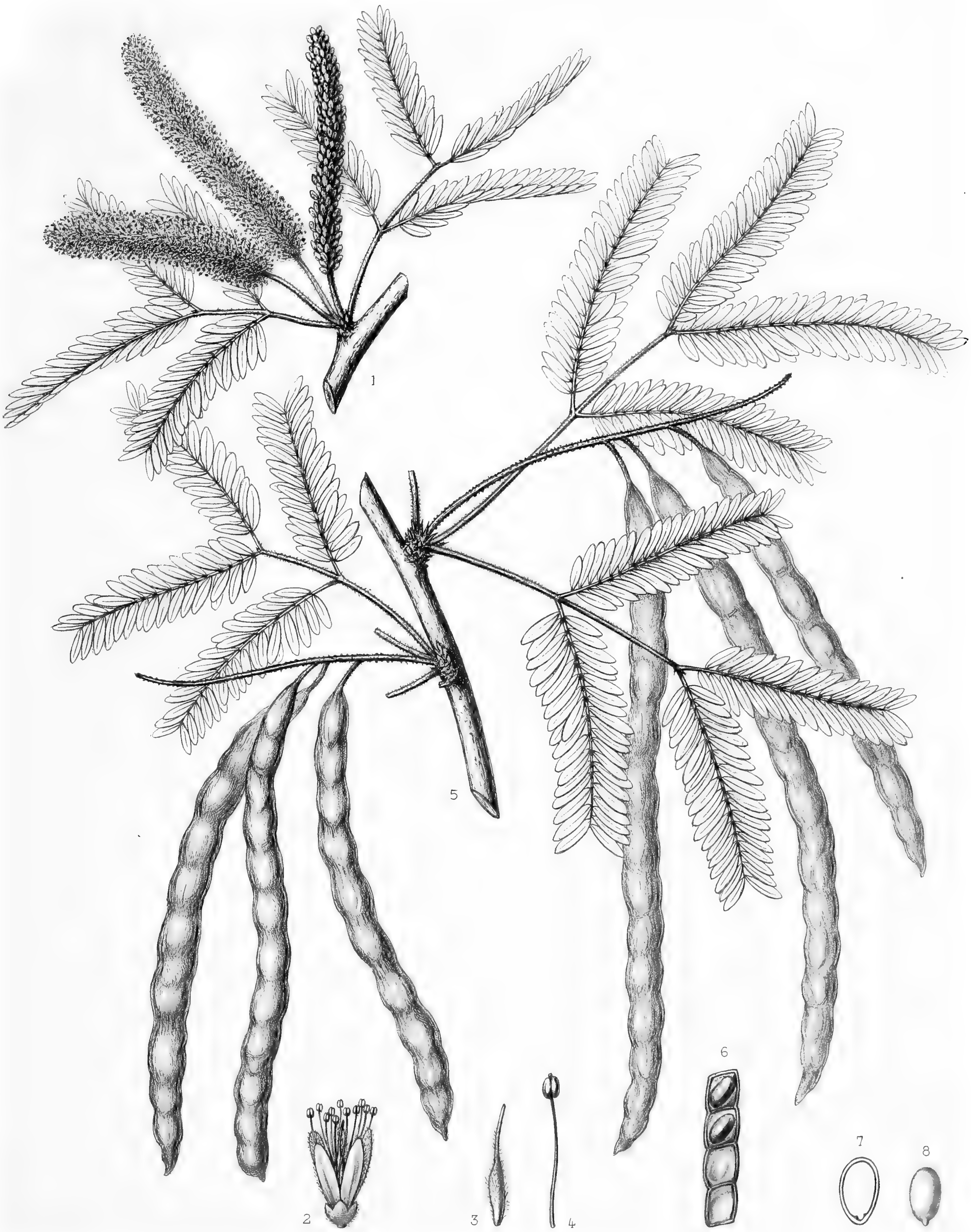
[1] From Nogales to Guaymas, Rose, January, 1897 (No. 1296); Guaymas, Rose, June, 1897 (No. 1296); El Grupo, Dr. W. J. McGee, December, 1896.

[2] The earliest specimen of this pubescent form was collected by Dr. George Thurber (No. 667) on the Gila River, and is preserved in the Gray Herbarium.

EXPLANATION OF THE PLATE.

PLATE DCXXVIII. PROSOPIS JULIFLORA, var. VELUTINA.

1. A flowering branch, natural size.
2. A flower, enlarged.
3. A pistil, enlarged.
4. A stamen, enlarged.
5. A fruiting branch, natural size.
6. Vertical section of a portion of a legume, natural size.
7. Vertical section of a seed, enlarged.
8. An embryo, enlarged.



C.E Faxon del

Rapine sc.

PROSOPIS JULIFLORA, VAR. VELUTINA, Sarg.

A. Riocreux direx.t

Imp. J. Taneur, Paris

LEUCÆNA GREGGII.

LEAVES 10 to 14-pinnate, glandular, the pinnæ 30 to 60-foliolate; stipules spinescent.

Leucæna Greggii, Watson, *Proc. Am. Acad.* xxiii. 272 (1888).

Leucæna glauca, Sargent, *Forest Trees N. Am.* 10*th Census U. S.* ix. 62 (in part) (not Bentham) (1884); *Silva N. Am.* iii. 111 (in part). — Coulter, *Contrib. U. S. Nat. Herb.* ii. 98 (*Man. Pl. W. Texas*) (in part).

A tree, from fifteen to twenty feet in height, with a stem four or five inches in diameter covered with dark brown bark three eighths of an inch in thickness divided into low ridges and broken on the surface into small closely appressed persistent scales, and stout zigzag red-brown branchlets marked by numerous pale lenticels and coated at first with short spreading deciduous lustrous yellow hairs, which also clothe the young petioles, the lower surface of the unfolding leaves, and the peduncles of the flower-heads and their bracts. The leaves are six or seven inches long and broad, with slender rachises which are furnished on the upper side with a single elongated bottle-shaped gland between the stalks of each pair of pinnæ. The pinnæ are remote and short-stalked, and their leaflets are lanceolate, acute or acuminate, often somewhat falcate, nearly sessile or short-petiolulate, full and rounded toward the base on the lower margin and nearly straight on the upper margin, gray-green, ultimately nearly glabrous, from one quarter to one third of an inch long and about one eighth of an inch wide, with narrow midveins and obscure lateral nerves. The stipules are gradually narrowed into long slender points which, becoming rigid and spinescent and from one third to nearly one half of an inch in length, continue to arm the branches for two or three years. The flowers are produced in heads from three quarters of an inch to nearly an inch in diameter which are borne on stout peduncles furnished at the apex with two irregularly three-lobed bracts and are from two to three inches in length, and solitary or in pairs; they are numerous, white, and sessile in the axils of small peltate bracts villose at the apex and raised on slender stalks which lengthen with the growing flower-buds and at maturity are as long as the calyx. This is coated with hairs only near the apex and is much shorter than the spatulate glabrous more or less boat-shaped petals. The stamens are much exserted, with small glabrous oblong anthers, and the ovary is villose, with a few short scattered hairs. The legume is linear, from six to eight inches long, from one third to one half of an inch wide, narrowed below to a short stout stipe, acuminate and crowned at the apex with the thickened style which varies from one third to three quarters of an inch in length, cinereo-pubescent until nearly fully grown but nearly glabrous at maturity, and much compressed, with narrow wing-like margins. The seeds are conspicuously notched by the hilum, dark chestnut-brown, very lustrous, half an inch long and a third of an inch wide.

Leucæna Greggii inhabits mountain ravines and the steep rocky banks of streams, and is distributed in western Texas from the valley of the upper San Saba River to that of Devil's River, and southward into Mexico, where it was discovered in the neighborhood of Rinconardo in 1847 by Dr. Josiah Gregg.[1]

The wood of *Leucæna Greggii* is heavy, hard, and close-grained, and contains many small regularly distributed open ducts, the layers of annual growth and medullary rays being hardly distinguishable. It is rich brown streaked with red, with thin clear sapwood. The specific gravity of the absolutely dry wood is 0.9235, a cubic foot weighing 57.55 pounds.[2]

[1] See vi. 33.

[2] In preparing the account of *Leucæna glauca* for the fourth volume of this work *Leucæna Greggii* was confounded with that species, and the description was based partly on Mexican specimens of *Leucæna Greggii*. Owing to this mistake, which was subsequently pointed out to me by Dr. B. L. Robinson of the Gray

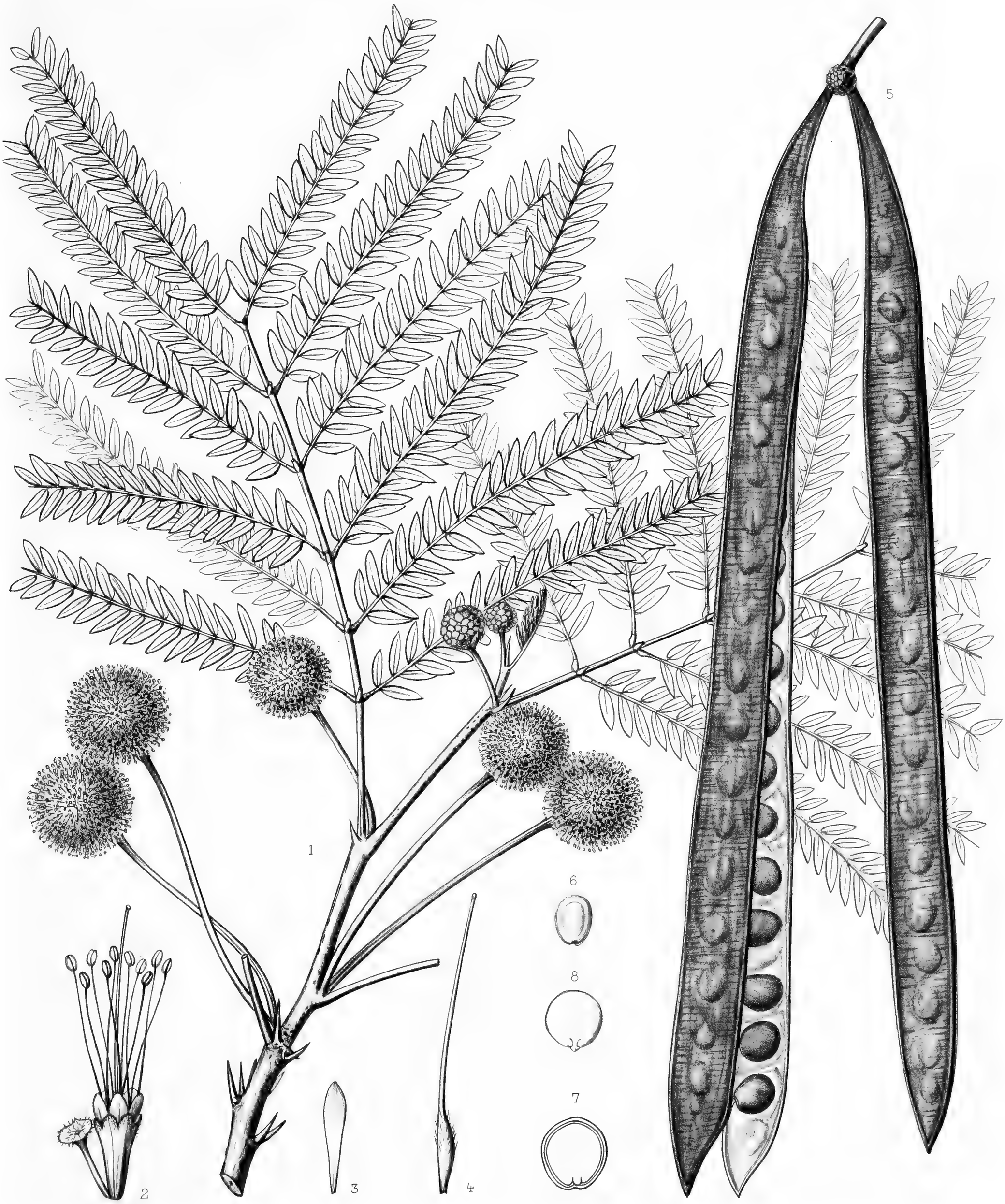
Herbarium, *Leucæna glauca* was considered a native of Texas. In reality this species, which is now widely distributed through the warm parts of the world by cultivation, does not appear to have obtained a foothold in Texas, and probably grows spontaneously in the United States only on the island of Key West, where it is shrubby in habit. I have seen no flower or foliage of *Leucæna Greggii* from Texas, and this tree is now admitted into *The Silva of North America* on the testimony of the late S. B. Buckley, who in 1882 wrote to me that this tree, which he had previously collected on the Lampasas Mountains in Mexico, "is also quite common along Devil's River of western Texas, also in the valley of the San Saba River in San Saba County. On Devil's River I saw it as a small tree in 1875. It grows singly or in groups, single trees not being uncommon. It grows in limestone soils of the cretaceous period in Texas. It ought to be cultivated in all the southern states. It would certainly be a valuable acquisition to the ornamental trees of the south."

My description of the bark and of the wood of *Leucæna glauca* (*Silva N. Am.* iii. 111) was drawn up from the wood specimen collected by Mr. S. B. Buckley on the San Saba River for the Jesup Collection of North American Woods in the American Museum of Natural History, New York.

EXPLANATION OF THE PLATE.

PLATE DCXXIX. LEUCÆNA GREGGII.

1. A flowering branch, natural size.
2. A flower with its bractlet, enlarged.
3. A petal, enlarged.
4. A pistil, enlarged.
5. A cluster of legumes, natural size.
6. A seed, natural size.
7. Vertical section of a seed, enlarged.
8. An embryo, enlarged.



C.E. Faxon del

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LEUCÆNA GREGGII, Wats.

A. Riocreux direx.t

Imp J. Taneur, Paris

ACACIA TORTUOSA.

FLOWERS in globose heads on elongated peduncles. Legume slender, elongated, puberulous. Branches armed with persistent spinescent stipules.

Acacia tortuosa, Willdenow, *Spec.* iv. 1083 (1805). — De Candolle, *Prodr.* ii. 461. — Sprengel, *Syst.* iii. 144. — Bentham, *Lond. Jour. Bot.* i. 392 ; *Trans. Linn. Soc.* xxx. 501 (*Rev. Mim.*). — Torrey, *Bot. Mex. Bound. Surv.* 62. — Grisebach, *Fl. Brit. W. Ind.* 222. — Hemsley, *Bot. Biol. Am. Cent.* i. 355. — Coulter, *Contrib. U. S. Nat. Herb.* ii. 99 (*Man. Pl. W. Texas*).

Mimosa tortuosa, Linnæus, *Spec.* ed. 2, 1505 (1763).

Acacia leucacantha, Sprengel, *Syst.* iii. 144 (1826).

Acacia albida, Lindley, *Bot. Reg.* xvi. t. 1317 (not Delile) (1830).

Usually shrubby in Texas, with numerous stems forming a symmetrical round-topped bush only a few feet high, *Acacia tortuosa* on the plain of the Rio Grande near Spofford occasionally becomes arborescent in habit and, reaching a height of from fifteen to twenty feet, forms a straight stem five or six inches in diameter covered with dark deeply furrowed bark and surmounted by an open irregular head of stout wide-spreading branches. The branchlets are slender, somewhat zigzag, slightly angled, roughened by numerous minute round lenticels, reddish brown, villose, with short pale hairs, and armed with thin terete puberulous spines developed from the persistent stipules and occasionally three quarters of an inch long. The leaves are alternate on the young branchlets and are fascicled from earlier axils ; they are generally less than an inch in length, short-petiolate, with slender puberulous rachises and with usually three or four pairs of pinnæ, and are early deciduous ; the pinnæ are sessile or short-stalked and remote, with from ten to fifteen pairs of leaflets. These are linear, somewhat falcate, acute, tipped with minute points, subsessile, light green, glabrous, and from one twentieth to one sixteenth of an inch in length. The peduncles appear in March with or just before the unfolding of the leaves and are axillary, solitary or usually clustered, slender, puberulous, from one half to three quarters of an inch in length, and furnished at the apex with two minute connate bracts. Before the flowers open the flower-heads are glabrous, and after the flowers open they are from one quarter to three eighths of an inch in diameter. The flowers are bright yellow and very fragrant, and are produced from the axils of minute clavate pilose bractlets. The calyx is only about one third as long as the corolla, with short lobes puberulous like those of the corolla, which is less than half as long as the filaments. The ovary is nearly sessile and covered with short close pubescence. The legumes are indehiscent, elongated, linear, slightly compressed, somewhat constricted between the numerous seeds, from three to five inches long and about a quarter of an inch wide, dark red-brown, and cinereo-puberulous. The seeds are in one series, obovate, compressed, dark red-brown, lustrous, and about a quarter of an inch long; their coat is crustaceous, with a thin testa and a thicker pale and harder tegmen. The embryo is pale yellow, with thick cotyledons and a short slightly exserted radicle.

In Texas *Acacia tortuosa* is distributed from the valley of the Rio Cibolo to Eagle Pass on the Rio Grande. What is considered the same species is common in northern and southern Mexico, the West Indies, Venezuela, and on the Galapagos Islands.[1]

Acacia tortuosa was collected by Lindheimer on the Rio Cibolo in 1850. It had been previously collected by Berlandier in 1843 in Tamaulipas, probably in the Rio Grande valley, and it

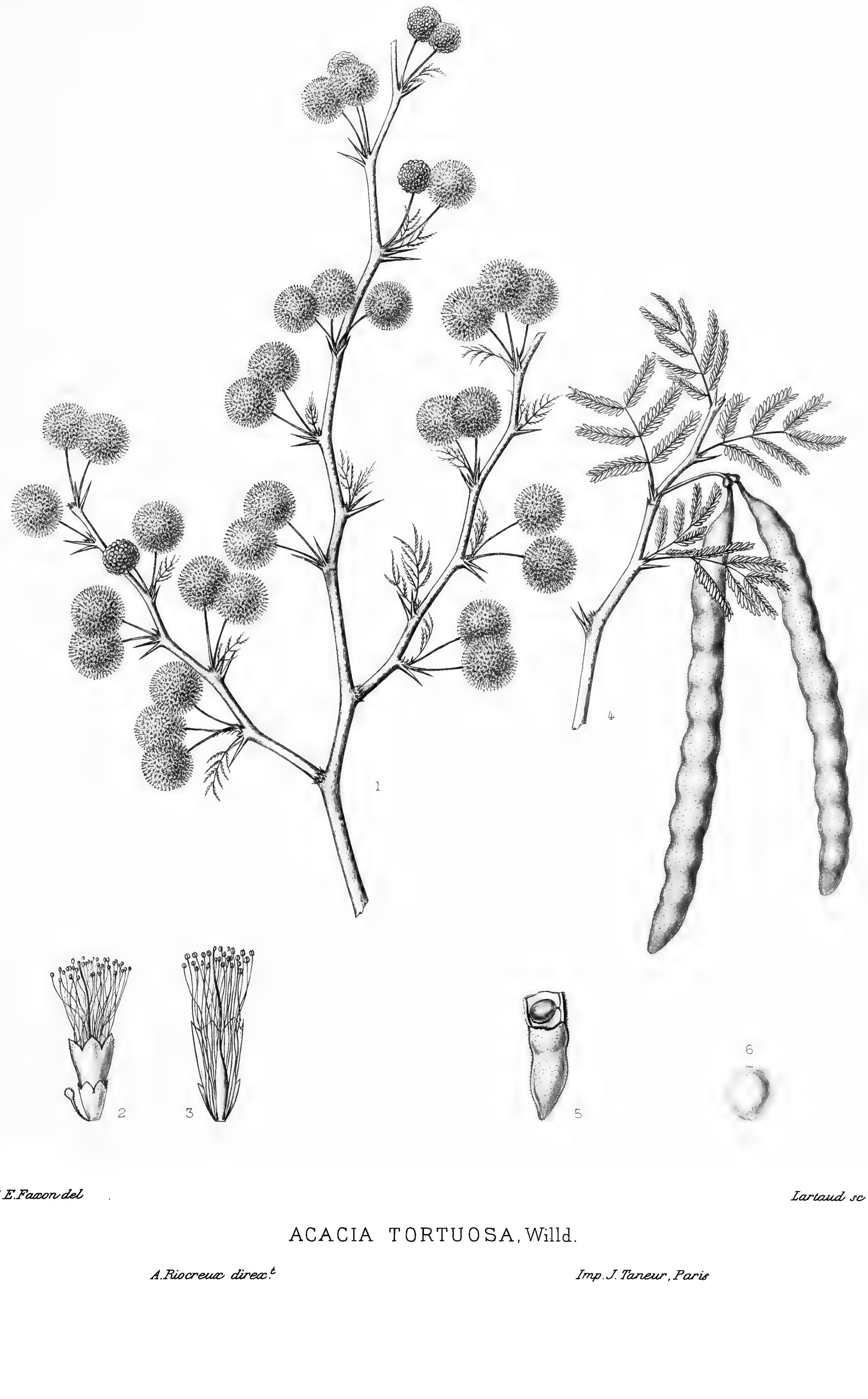
[1] I have followed Bentham and Gray in considering this western Texas Acacia identical with the West Indian, Mexican, tropical American, and Galapagos species, but as its range in Texas and in the adjacent parts of Mexico appears to be so restricted, it is not improbable that a better knowledge than is now available of the tropical American species will show it to be distinct.

was collected on the Rio Grande by the botanists of the Mexican Boundary Survey at about the same time, and near Eagle Pass by Schott in 1854.

EXPLANATION OF THE PLATE.

PLATE DCXXX. ACACIA TORTUOSA.

1. A flowering branch, natural size.
2. A flower, with its bractlet, enlarged.
3. Vertical section of a flower, enlarged.
4. A fruiting branch, natural size.
5. Portion of a legume, natural size.
6. A seed, enlarged.



C.E.Faxon del.

Lartaud sc

ACACIA TORTUOSA, Willd.

A.Riocreux direx.t

Imp.J.Taneur, Paris

PRUNUS UMBELLATA, var. INJUCUNDA.

Sloe.

CALYX-LOBES entire, pubescent on the outer, tomentose on the inner surface. Fruit subglobose to short-oblong. Leaves oblong to obovate-lanceolate, tomentose below.

Prunus umbellata, var. injucunda. **Prunus injucunda**, Small, *Bull. Torrey Bot. Club*, xxv. 149 (1898).

A tree, sometimes twenty feet in height, with a trunk occasionally six or eight inches in diameter covered with nearly black furrowed bark, and stout erect or ascending branches forming an open irregular head; or often shrubby and spreading into broad thickets. The slender and frequently spinescent branches are coated with hoary tomentum when they first appear, and become reddish brown and pubescent during their first season, dark purple and puberulous in their second year, and ultimately dull gray-brown. The leaves are oblong or rarely obovate-lanceolate, acute or acuminate at the apex, gradually narrowed and cuneate at the base, finely serrate, with minute glandular teeth, and often furnished at the base with two large conspicuous dark glands; when they unfold they are coated below with hoary tomentum and are villose above, and at maturity they are membranaceous, dark yellow-green, tomentose or pubescent on the lower surface, particularly along the stout yellow midribs and slender primary veins, roughened above by short pale hairs, and usually about two inches long and an inch wide; they are borne on stout tomentose petioles a quarter of an inch in length. The stipules are linear, glandular-serrate, from one eighth to one quarter of an inch long, and caducous. The flowers appear from the tenth to the middle of April, just before the leaves, in subsessile usually five-flowered umbels on slender pubescent pedicels from one half to five eighths of an inch in length. The calyx-tube is narrowly obconic and villose, with acuminate entire lobes villose on the outer surface and tomentose on the inner surface. The petals are nearly orbicular and abruptly contracted into short claws. The filaments are glabrous, and the pistil is villose toward the base, with short pale hairs. The fruit ripens in July and is short-oblong or subglobose, dark purple, slightly pruinose, and about half an inch in diameter, with thin austere flesh. The stone is ovoid, pointed at the ends, somewhat compressed, only slightly rugose, acutely ridged on the ventral suture, with a broad grooved ridge, conspicuously grooved on the dorsal suture, and about one third of an inch long, with thin brittle walls.

Prunus umbellata, var. *injucunda*, is common about the base of Stone Mountain and of Little Stone Mountain in the granitic district of De Kalb County, central Georgia,[1] where it was first noticed in July, 1893, by Mr. John K. Small.[2]

From *Prunus umbellata* of the south Atlantic and Gulf states this Plum-tree differs only in its

[1] Leaves of a low shrubby Plum gathered by Dr. Charles Mohr on sandstone cliffs at the summit of the Alpine Mountains, Talladega County, Alabama, in September, 1892, have been referred by Small to his *Prunus injucunda*. (See Mohr, *Bull. Torrey Bot. Club*, xxvi. 118; *Contrib. U. S. Nat. Herb.* vi. 552 [*Plant Life of Alabama*].)

[2] John Kunkel Small (January 31, 1869) was born at Harrisburg, Pennsylvania, of German ancestry, and was educated in private schools in his native city, at Franklin and Marshall College and Columbia University. A natural love of plants, fostered by that of his father and mother and stimulated by visits at his home from Professor Thomas C. Porter, who married his mother's sister, early directed the thoughts of the boy to botany. From 1892 to 1894 he held a botanical fellowship in Columbia, and in 1895 he received the degree of Ph. D. from that university, and was appointed curator of its herbarium. He is now curator of the museum and herbarium of the New York Botanical Garden. Since 1888 Mr. Small has been active in exploring the flora of the eastern and southern states, and has published numerous botanical papers, principally in the *Bulletin of the Torrey Botanical Club*, in which many previously undescribed species have been distinguished. Species in Xyris, Smilax, Listera, Pentstemon, and Senecio commemorate his zeal in this field.

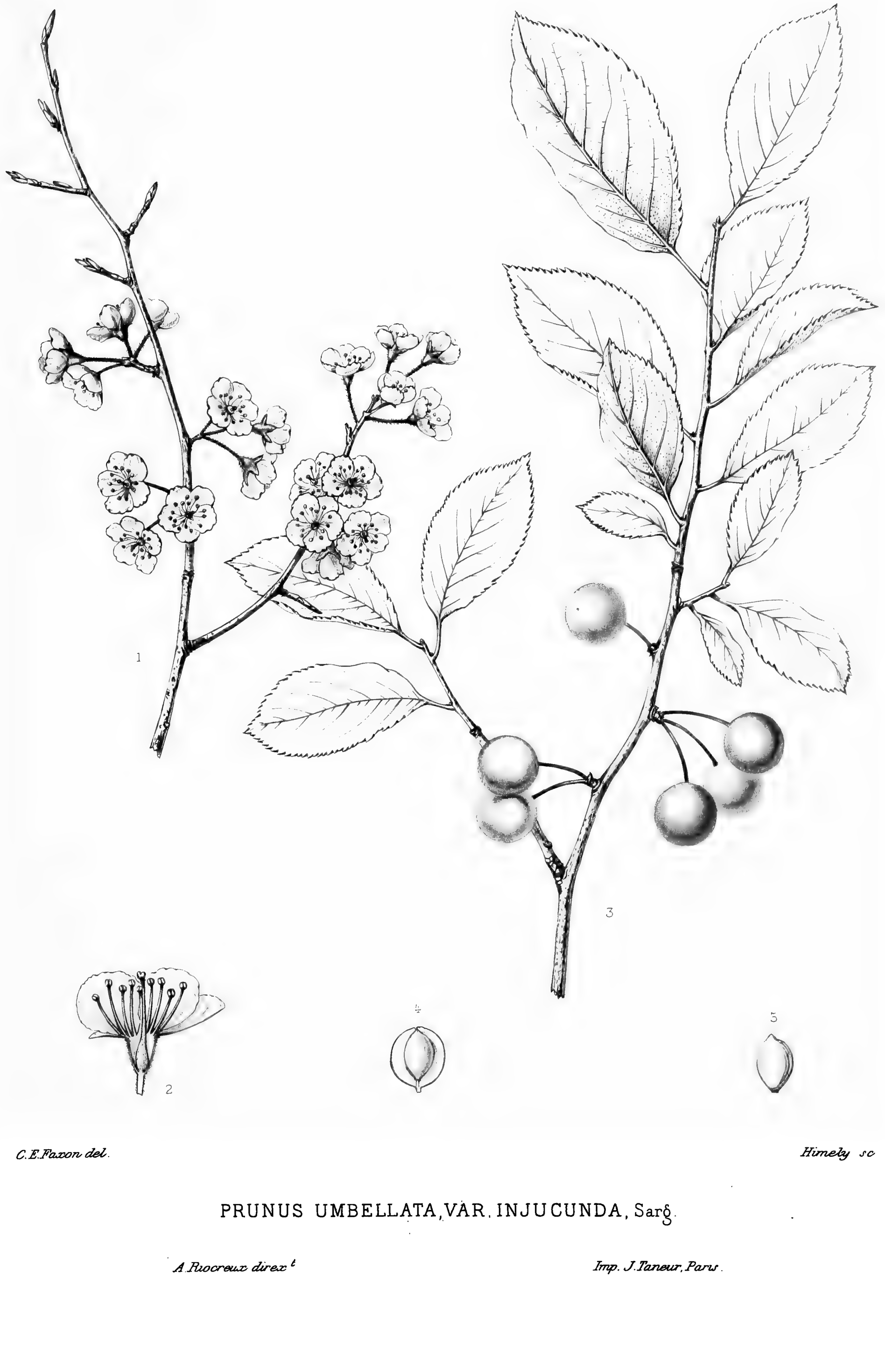
tomentose young branches, its tomentose or pubescent leaves, in its hairy umbels, tomentose calyx and pistil, and in the shape of the fruit, which varies from subglobose to short-oblong.[1]

[1] *Prunus umbellata* is often quite glabrous with the exception of a few hairs along the under surface of the young leaves and the tomentum on the inner side of the calyx-lobe, but more or less pubescent individuals occur in widely scattered regions, and among the Plum-trees which grow about the base of Stone Mountain there are plants which are pubescent rather than tomentose, and others which are nearly glabrous.

EXPLANATION OF THE PLATE.

PLATE DCXXXI. PRUNUS UMBELLATA, var. INJUCUNDA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A fruiting branch, natural size.
4. Vertical section of a fruit, showing stone, natural size.
5. A stone, natural size.



C.E.Faxon del.

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PRUNUS UMBELLATA, VAR. INJUCUNDA, Sarg.

A.Riocreux direx.t

Imp. J.Taneur, Paris.

PRUNUS TARDA.

Sloe.

CALYX-LOBES acuminate, entire, villose on the outer, tomentose on the inner surface. Fruit red, yellow, purple, black, or blue. Leaves oblong to obovate.

Prunus tarda, Sargent, *Bot. Gazette*, xxxiii. 108 (1902).

A tree, from twenty to twenty-five feet in height, with a tall trunk eighteen or twenty inches in diameter, and wide-spreading branches forming an open symmetrical head. The bark of the trunk is light brown tinged with red, from one half to five eighths of an inch in thickness, and divided by shallow interrupted fissures into flat ridges broken on the surface into small loose plate-like scales. The branchlets are slender and marked by small scattered dark lenticels, and when they first appear they are light green and coated with hoary tomentum, becoming glabrous, light red-brown and lustrous during their first summer, and darker at the end of their second year, when they lose their lustre. The winter-buds are narrow, acute, the color of the branchlets, and from one sixteenth to one eighth of an inch in length. The leaves are oblong or occasionally somewhat obovate, acute or acuminate and short-pointed at the apex, gradually narrowed and rounded or cuneate at the base, and finely serrate, with straight or incurved teeth tipped with dark minute persistent glands; as they unfold they are glabrous or rarely scabrous or puberulous above and cinereo-tomentose below, and at maturity they are thick and firm in texture, dark yellow-green and glabrous on the upper surface, pale and pubescent or puberulous on the lower surface, particularly along the prominent light yellow midribs and thin primary veins, from an inch and a half to three inches long and from three quarters of an inch to an inch and a quarter wide; they are borne on stout tomentose or ultimately pubescent petioles which vary from one third to one half of an inch in length and are furnished at the apex with two large round stalked dark glands or are often eglandular. The stipules are acicular, often bright red, and about a third of an inch long. The flowers, which are about three quarters of an inch in diameter, appear early in April with or before the leaves, and are borne in subsessile two or three-flowered umbels, on slender glabrous pedicels from five eighths to three quarters of an inch in length. The calyx-tube is narrowly obconic, glabrous toward the base, villose above, with acute entire lobes villose on the outer surface and coated on the inner surface with thick hoary tomentum. The petals are oblong-obovate and gradually contracted below into short claws. The filaments and pistils are glabrous. The fruits, which ripen late in October or early in November and sometimes do not entirely fall until nearly the beginning of December, are borne on stout rigid peduncles, and vary from short-oblong to subglobose and from one third to one half of an inch in length. The skin is tough and thick; and clear bright yellow on some trees, it is bright red on others, and on others either purple, dark blue, or black. The flesh is thick and very acid and adheres firmly to the stone, which is ovoid, more or less compressed, very rugose, obscurely ridged on the ventral suture and slightly grooved on the dorsal suture, acute and apiculate at the apex, and rounded at the base.

Prunus tarda inhabits glades and open woods in the neighborhood of Marshall, Texas, where it was discovered in April, 1901, by W. M. Canby, B. F. Bush, and C. S. Sargent, and ranges to western Louisiana and southern Arkansas. Resembling in many of its characters *Prunus umbellata*, with which it has been sometimes confounded, *Prunus tarda* is well distinguished from that species by its remarkable bark, which is unlike that of any other American Plum-tree and which is hardly to be distinguished from that of *Castanea pumila*, growing with it, by the pubescence of the leaves, which

usually does not occur on those of the ordinary form of *Prunus umbellata*, and by its variously colored and unusually late-ripening fruit.

The fruit, which is produced in great quantities, is used locally in pies and for preserves.

EXPLANATION OF THE PLATE.

PLATE DCXXXII. PRUNUS TARDA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A fruiting branch, natural size.
4. Vertical section of a fruit, natural size.
5. A stone, natural size.
6. A stone, divided transversely, natural size.

C.E.Faxon del. *Lartaud sc.*

PRUNUS TARDA, Sarg.

A.Riocreux direx.t *Imp. J.Taneur, Paris.*

PRUNUS ALABAMENSIS.

Wild Cherry.

CALYX-LOBES persistent. Stone ovoid, compressed. Leaves oval, broadly ovate or obovate, pubescent below.

Prunus Alabamensis, Mohr, *Bull. Torrey Bot. Club*, xxvi. 118 (1899); *Contrib. U. S. Nat. Herb.* vi. 552 (*Plant Life of Alabama*).

Prunus serotina neo-montana, Mohr, *Contrib. U. S. Nat. Herb.* vi. 552 (*Plant Life of Alabama*) (not Sudworth) (1901).

A tree, from twenty-five to thirty feet in height, with a short trunk covered with dark rough bark separating freely into small thin scales and rarely ten inches in diameter, and spreading, somewhat drooping branches. The branchlets, which are slender and marked by numerous small dark lenticels, are coated when they first appear with pale tomentum and are dark red-brown during their first season, nearly glabrous before winter, and much darker in their second year. The leaves are oval, broadly ovate, or occasionally obovate, acute, short-pointed or rounded at the apex, cuneate, rounded, or rarely slightly obcordate at the base, and finely serrate, with incurved teeth tipped with minute or sometimes near the base of the blade with larger dark glands; when they unfold they are coated below and on the upper side of the midribs with fine pubescence, and at maturity they are thick and firm in texture, four or five inches long and usually about two inches wide, dark dull green and glabrous on the upper surface, and dull and covered on the lower surface with short simple or forked hairs which lengthen, are most abundant and sometimes rufescent on the slender midribs and primary veins; they are borne on short grooved tomentose ultimately pubescent petioles which are eglandular or occasionally furnished near the apex with one or two large dark glands. The stipules are lanceolate, acuminate, glandular-serrate, bright red like the accrescent inner bud-scales, about half an inch long, and caducous. The flowers, which appear during the first week of May when the leaves are about half grown, are produced on spreading or erect pubescent racemes three or four inches long, and are borne on pubescent pedicels from the axils of ovate or obovate acuminate bright pink caducous bracts; they are about one quarter of an inch in diameter when fully expanded, with a broad cup-shaped puberulous calyx-tube, short almost triangular calyx-lobes, white nearly orbicular petals abruptly narrowed into short claws, glabrous filaments and pistil, and a thick club-shaped stigma. The fruit ripens late in September and is subglobose or short-oblong, surrounded at the base by the persistent calyx and filaments of the flower, one third of an inch in diameter, and dark red or finally nearly black. The stone is ovoid, somewhat compressed, ridged on the ventral margin, with a broad low ridge, slightly grooved on the dorsal margin, and a quarter of an inch long.

Prunus Alabamensis grows on a few of the summits of the low mountains of central Alabama,[1] and was discovered in July, 1892, by Dr. Charles Mohr.[2] It is well distinguished from *Prunus serotina* by its usually oval comparatively broader and less acuminate dull leaves pubescent on the lower surface, by its pubescent racemes and calyx, and by the fact that it flowers and ripens its fruit several weeks later in the season than that species.

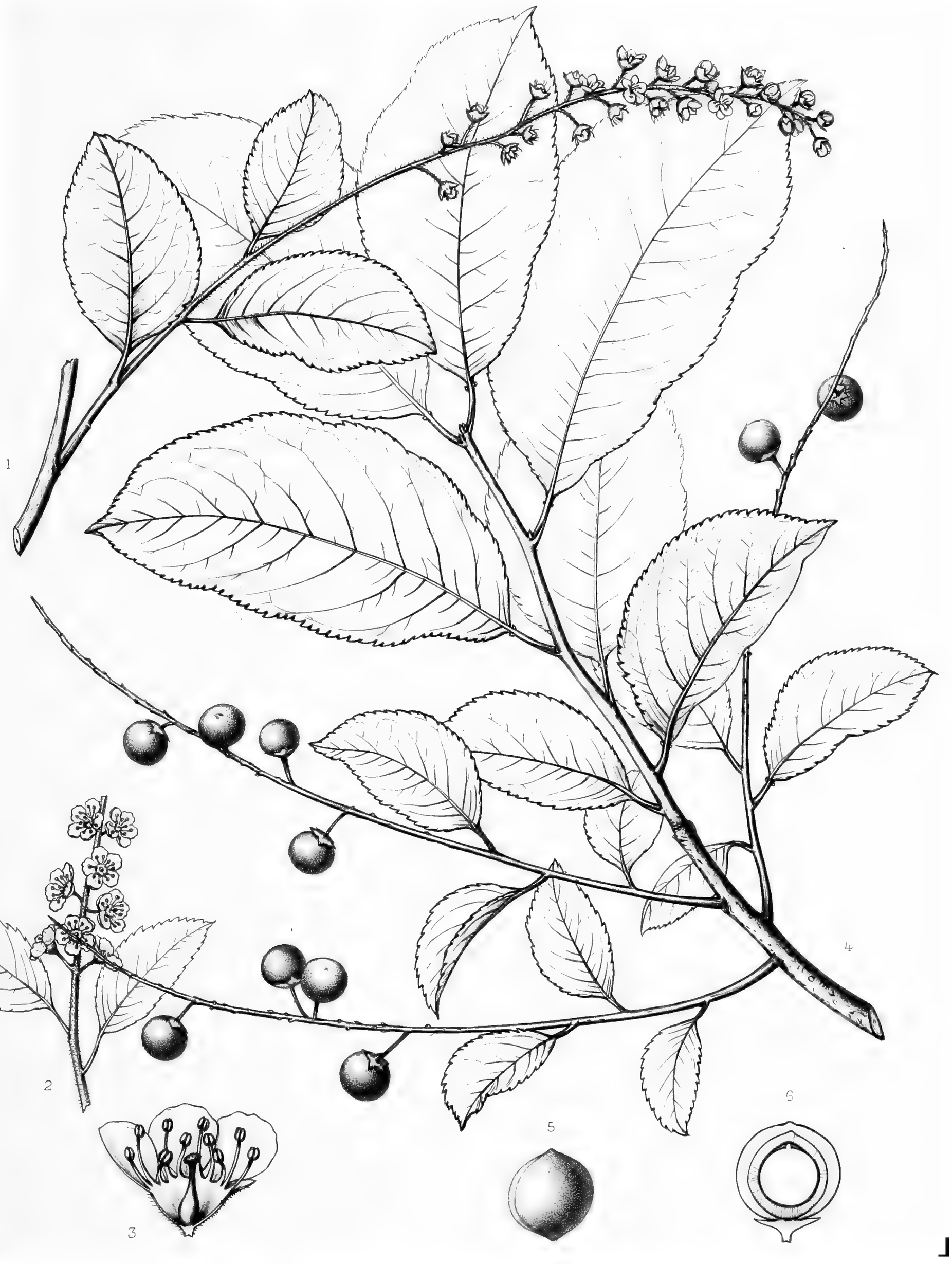
[1] Rocky heights of the Alpine Mountains, Talladega County, at two thousand feet altitude, C. Mohr, September, 1892, and September, 1893; summit of Red Mountain, Birmingham, at an elevation of one thousand feet, C. Mohr, May, 1898, C. S. Sargent, October, 1898, April, 1900, C. D. Beadle, July, 1899; Talladega and Crumplers' Mountain, Childersburg, Talladega County, C. D. Beadle, 1899.

[2] See iv. 90. Dr. Mohr died at Asheville, North Carolina, on the 17th of July, 1901, only a few days before the publication by the United States of his *Plant Life of Alabama*, his most important botanical work.

EXPLANATION OF THE PLATE.

PLATE DCXXXIII. PRUNUS ALABAMENSIS.

1. A flowering branch, natural size.
2. Part of a raceme of flowers, natural size.
3. Vertical section of a flower, enlarged.
4. A fruiting branch, natural size.
5. A stone, enlarged.
6. Vertical section of a fruit, enlarged.



C.E.Faxon del.

Em.Himely sc.

PRUNUS ALABAMENSIS, Mohr

A.Riocreux direx.t

Imp. J.Taneur, Paris.

CERCOCARPUS BREVIFLORUS.

Mountain Mahogany.

LEAVES oblong-obovate to narrowly elliptic, rounded or acute at the apex.

Cercocarpus breviflorus, Gray, *Smithsonian Contrib.* v. 54 (*Pl. Wright.* ii.) (1853). — Walpers, *Ann.* iv. 665. — Hemsley, *Bot. Biol. Am. Cent.* i. 373.

Cercocarpus parvifolius, Hemsley, *Bot. Biol. Am. Cent.* i. 374 (in part) (not Nuttall) (1879). — Sargent, *Silva N. Am.* iv. 65 (in part).

Cercocarpus parvifolius, var. **breviflorus**, M. E. Jones, *Zoë*, ii. 245 (1891); iii. 295.

Cercocarpus paucidentatus, Britton & Kearney, *Trans. N. Y. Acad.* xiv. 31 (probably not *Cercocarpus parvifolius*, var. *paucidentatus*, Watson) (1894).

A tree, from twenty to twenty-five feet tall, with a long straight stem sometimes six or eight inches in diameter, and erect rigid branches forming a narrow open or irregular head; or frequently shrubby with numerous clustered stems often only a few feet in height.[1] The bark of the trunk is about one eighth of an inch in thickness, divided by shallow fissures and broken on the surface into small light red-brown scales. The branchlets are slender, rigid, bright red-brown, lustrous, marked irregularly by large scattered pale lenticels, and when they first appear are covered with a thick coat of hoary tomentum which, gradually disappearing, leaves them villose or pubescent for two or three years, and ultimately ashy gray or gray tinged with red, the spur-like lateral branchlets being much roughened by the ring-like scars of fallen leaves. The leaves vary from oblong-obovate to narrowly elliptic, and are acute or rounded and often apiculate at the apex, gradually narrowed from above the middle and acute at the base, with margins which are revolute, often undulate, and entire or dentate toward the apex, with few small straight or incurved apiculate teeth; when they unfold they are coated with hoary tomentum, and at maturity they are thick, gray-green on the upper surface, pale on the lower surface, covered with soft pale hairs which are most abundant on the under side of the stout midribs and primary veins, from one half of an inch to an inch long, and usually about one quarter of an inch wide; they are borne on stout tomentose petioles which ultimately sometimes become light red in color and are pubescent or nearly glabrous. The stipules are linear-lanceolate, tomentose, about as long as the petioles, and caducous. The flowers, which appear from March to May, and often again in August, are nearly sessile, and solitary or in pairs in the axils of the crowded leaves. The calyx-tube is slender and varies from one sixteenth to one quarter of an inch in length, and like the short rounded calyx-lobes is coated on the outer surface with dense white tomentum. The mature calyx-tube is stalked, spindle-shaped, light red-brown, pubescent above, tomentose toward the base, deeply cleft at the apex, and about a quarter of an inch long. The akene is nearly terete and covered with long white hairs, which also clothe the persistent style.[2]

Cercocarpus breviflorus grows in forests of Pines and Oaks on the dry ridges of the mountains of southern Arizona and New Mexico, and of the extreme western part of Texas,[3] usually at elevations of

[1] The wood specimen of *Cercocarpus breviflorus* in the Jesup Collection of North American Woods in the American Museum of Natural History, New York, is six inches in diameter inside the bark, and shows forty-seven layers of annual growth, the sap-wood being one sixteenth of an inch in thickness, with sixteen layers of annual growth.

[2] Since the fourth volume of this work was published I have revisited southern Arizona and restudied the peculiar Cercocarpus which grows in the mountain forests of this region, and, finding its characters constant and the trees always easily distinguishable from those growing in other parts of the country, I believe that it can be best treated as a species; or if it is still to be considered only a geographical variety of the extremely variable *Cercocarpus parviflorus*, that it is worthy of a plate in *The Silva of North America*.

[3] Foothills of the Guadaloupe Mountains, Havard, 1882 (No. 246 in Herb. Gray).

over five thousand feet above the level of the sea, and ranges southward over some of the mountains of northern Mexico.[1] It was discovered near Frontera, New Mexico, in July, 1851, by Mr. Charles Wright.[2]

[1] Chihuahua, Thurber, August, 1852 (No. 772 in Herb. Gray). Piñon, Sonora, Hartmann, 1894 (Archæological Expedition to Northwestern Mexico, No. 366) (In Herb. Gray).

[2] See i. 94.

EXPLANATION OF THE PLATE.

PLATE DCXXXIV. CERCOCARPUS BREVIFLORUS.

1. A flowering branch, natural size.
2. A flower, enlarged.
3. Vertical section of a flower, enlarged.
4. An anther, enlarged.
5. A fruiting branch, natural size.
6. A fruit, enlarged.
7. Vertical section of a fruit, enlarged.
8. A seed, enlarged.

C.E.Faxon del. Em.Himely sc.

CERCOCARPUS BREVIFLORUS, Gray.

A. Riocreux direx.t Imp. J. Taneur, Paris.

CERCOCARPUS TRASKIÆ.

LEAVES broadly oval to orbicular, cinereo-tomentose on the lower surface.

Cercocarpus Traskiæ, Eastwood, *Proc. Cal. Acad.* ser. 3, i. 136, t. 11, f. 7*a*–7*e* (1898).

A tree, occasionally twenty-five feet in height, with stout wide-spreading branches, and with a trunk which is often inclining, usually much contorted, from two to ten inches in diameter and from six to eight feet long to the first branches, and which is covered with smooth light gray-brown bark sometimes slightly broken by shallow fissures and marked by irregular cream-colored blotches. The branchlets are stout, marked by numerous small scattered lenticels, coated at first with hoary tomentum, bright reddish brown during two or three years, ultimately dark gray-brown and conspicuously roughened by the enlarged ring-like leaf-scars. The leaves are oval or semiorbicular, rounded or acute at the apex, cuneate, rounded, or occasionally somewhat cordate at the narrow base, and revolute at the margins, which are entire below the middle and coarsely sinuate-dentate above, with slender teeth tipped with minute dark glands; when they unfold covered above with soft pale hairs and below with thick hoary tomentum, at maturity they are coriaceous, dark green and lustrous on the upper surface, cinereo-tomentose on the lower surface, from an inch and a half to two inches long and from an inch to an inch and a half wide, with prominent primary veins running obliquely to the points of the teeth and, like the stout midribs, conspicuously impressed on the upper side, and stout tomentose petioles about a quarter of an inch long. The flowers, which are nearly sessile in axillary many-flowered umbels and appear early in March, are coated on the outer surface with thick white tomentum, and vary from one half to three quarters of an inch in length. The calyx is broad and abruptly enlarged into the broad campanulate five-toothed border which is glabrous on the inner surface. The anthers are tomentose, with short-oblong cells united by a broad connective. The fruiting calyx is spindle-shaped, light reddish brown, villose-pubescent, deeply cleft at the apex, and about half an inch in length. The akene is slightly ridged on the back, one third of an inch long, covered with long lustrous white hairs, and tipped with the persistent hairy style which varies from an inch and a half to two inches in length.

Cercocarpus Traskiæ inhabits the south coast of Santa Catalina Island, southern California, where it grows only on the steep sides of a deep narrow hot arroyo with walls only a few feet apart and rising to a height of from one hundred to five hundred feet, in a broken volcanic and inaccessible region. Here forty or fifty individuals of this tree, growing at elevations varying from two hundred to three hundred feet above the sea-level, with *Adenostoma fasciculatum*, *Rhus integrifolia*, *Rhus ovata*, and *Ceanothus cuneatus*, var. *macrocarpus*, were discovered in March, 1897, by Mrs. Blanche Trask.[1]

Cercocarpus Traskiæ, with its large leaves dark green and lustrous above and white below, and its numerous clusters of snow-white flowers, is the most beautiful species of the genus.[2]

[1] Luella Blanche Trask was born Engle, July 25, 1865, at Waterloo, Iowa. For seven years Mrs. Trask has lived at Avalon, on Santa Catalina Island, which she has explored with enthusiasm and success. In 1897 she made a collection of plants on San Nicholas, a small reef-bound island fifty miles to the westward of Santa Catalina, which she was the first woman to visit; and on San Clemente she made interesting discoveries in 1896. (See *Erythea*, viii. 107.) Mrs. Trask has written *The Heart of Catalina*, published in *The Land of Sunshine*, and has made several other contributions to that magazine.

[2] Very unlike the other species which inhabit the United States, *Cercocarpus Traskiæ* most resembles the Mexican *Cercocarpus fothergilloides*, from which it differs in its broader often orbicular thicker and more coarsely dentate leaves, in its larger and more tomentose flowers with stouter calyx-tubes and broader calyx-lobes, and in its tomentose anthers.

EXPLANATION OF THE PLATE.

PLATE DCXXXV. CERCOCARPUS TRASKIÆ.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A stamen, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, enlarged.
6. A seed, enlarged.
7. An embryo, enlarged.

C.E.Faxon del.

Em Himely sc.

CERCOCARPUS TRASKIÆ, Eastw.

A.Riocreux direxit

Imp. J.Taneur, Paris.

CRATÆGUS.

In the fourth volume of this work, published in 1892, fourteen species with four varieties of Cratægus were described. During the ten years which have passed since that volume appeared, the genus has received much attention from the students of trees in the United States, and a large number of forms previously unknown have been characterized. A number of these are now described and figured in this volume. In addition to these are now known several shrubby species which do not necessarily find a place in a work devoted to trees, and a number of trees which are imperfectly known. To study these sufficiently to bring them into this Silva would require several years of additional field work, and an attempt to include them all would delay perhaps indefinitely the appearance of these supplementary volumes. The fact, therefore, must be recognized that this Silva does not include all the arborescent forms of Cratægus which are now known to exist in North America. These must find their places in some later work of North American dendrology.

In this study of the genus particular attention is paid to the number of stamens and the color of the anthers as important characters for distinguishing species. The simplest arrangement of stamens in the flowers of Cratægus is in one series of five stamens which are opposite the sepals and alternate with the petals. In certain species these five stamens split, and there are then ten stamens in five pairs opposite the sepals, but in some individuals this division is only partial, and flowers of species which normally have ten stamens are occasionally found with from seven to nine stamens. In some species the one row of five pairs of stamens is supplemented by a second and inner row of five stamens which are rather shorter than the stamens of the outer row and are opposite the petals. Some of the stamens of this second row may not develop, and the whole number may vary from eleven to fifteen. In some species there is a third row of five stamens which are shorter than those of the second row and alternate with them. Species with the three rows of stamens have therefore normally twenty stamens, but one or more of the inner row may not develop, and species with normally twenty stamens have sometimes a number which may vary from sixteen to twenty. In a small group of shrubby southern species there is sometimes a fourth row and twenty-five stamens. The flowers of Cratægus then have normally five stamens in one row, ten stamens in one row of five pairs, fifteen stamens in two rows, twenty stamens in three rows, and rarely twenty-five stamens in four rows, the number in each group varying by the suppression of one or more of the stamens.

The color of the anthers, which are either pale yellow or various shades of rose color or purple, generally affords a constant specific character. In *Cratægus punctata*, however, the anthers are rose color on some trees and yellow on others, trees with yellow anthers usually producing yellow fruit and those with red anthers red fruit. In some parts of New England there is a Thorn which is still very imperfectly known, and which apparently differs from *Cratægus pruinosa* with its rose-colored anthers only in its pale yellow anthers, and there are indications that *Cratægus Crus-galli* in the middle states and in Missouri sometimes at least has flowers with yellow anthers. But these variations, except in the case of *Cratægus punctata*, must not be considered conclusive, for it is not improbable that besides the color of the anthers there may be other characters which will make it possible to distinguish these plants specifically. Flowers with from five to ten stamens usually have two or three styles and nutlets, while the species with fifteen stamens or more have generally five but often four styles and nutlets. There are,

however, several variations from this arrangement, and the number of styles and nutlets appears a less satisfactory character for distinguishing species than the number of stamens. The nature and amount of the hairy covering of the young branchlets, leaves, and calyx, and the time of flowering and of the ripening and falling of the fruit of Cratægus also afford useful characters for determining species.[1]

[1] In this restudy of the genus Cratægus I have been assisted by many correspondents, particularly by Mr. C. D. Beadle of the Biltmore Herbarium, Mr. William M. Canby of Wilmington, Delaware, Mr. B. F. Bush of Courtney, Missouri, Mr. E. J. Hill of Chicago, Illinois, Mr. D. W. Beadle of Toronto, Ontario, Mr. C. C. Laney and Mr. John Dunbar of the Park Department of the city of Rochester, New York, Miss Emma J. Cole of Grand Rapids, Michigan, Mr. J. G. Jack of the Arnold Arboretum, Mr. A. H. Curtiss of Jacksonville, Florida, Mr. Julius Reverchon of Dallas, Texas, and Mr. J. B. S. Norton of the Missouri Botanical Garden.

CONSPECTUS OF THE NORTH AMERICAN ARBORESCENT SPECIES.

MACROCARPÆ.

Fruit medium size, black or blue; nutlets 5, grooved or ridged on the back; corymbs many-flowered. *Melanocarpæ.*

- Leaves broadly ovate to oblong-ovate. Fruit black . . . . . 1. DOUGLASII.[1]
- Leaves rhombic or oval. Fruit blue-black . . . . . 2. SALIGNA.
- Leaves oblong-lanceolate to ovate. Fruit bright blue . . . . . 3. BRACHYACANTHA.

Fruit medium size, dull red or green tinged with red (except Nos. 6, 7, 10, 13, and 15), often slightly pruinose; nutlets 2 or 3 (Nos. 9, 3–4, 11, 3–5), obtuse, prominently ridged on the back; corymbs many-flowered; leaves subcoriaceous (except Nos. 8, 11, and 13), dark green and lustrous. *Crus-galli.*

Stamens 10.

Anthers rose color or purple.

- Leaves obovate-cuneiform to broadly ovate . . . . . 4. CRUS-GALLI.
- Leaves oblong-oval to ovate, usually acute . . . . . 5. CANBYI.
- Leaves obovate or elliptical, villose . . . . . 6. ENGELMANNI.
- Leaves obovate, usually short-pointed . . . . . 7. PEORIENSIS.
- Leaves thin, oblong-obovate to oval or broadly ovate . . . . . 8. FECUNDA.

Anthers probably yellow (No. 11 doubtful).

- Leaves broadly oval to obovate . . . . . 9. ERECTA.
- Leaves oval to oblong-obovate, acute or acuminate . . . . . 10. ACUTIFOLIA.
- Leaves thin, obovate, rounded or acute . . . . . 11. SIGNATA.

Stamens 20.

Anthers rose color.

- Leaves obovate to elliptical . . . . . 12. BUSHII.
- Leaves thin, obovate, rounded at the apex, villose . . . . . 13. BERBERIFOLIA.
- Leaves oblong-obovate, acute, scabrate . . . . . 14. EDITA.

Anthers yellow.

- Leaves usually obovate, acute . . . . . 15. MOHRI.

Fruit medium size, red or green, often slightly five-angled, pruinose; nutlets 5, more or less grooved on the back; corymbs many-flowered; stamens 20; anthers rose color; leaves blue-green, subcoriaceous, nearly glabrous. *Pruinosæ.*

- Leaves elliptical to ovate . . . . . 16. PRUINOSA.
- Leaves ovate, acute or acuminate . . . . . 17. GEORGIANA.

Fruit medium size, greenish red or yellow; nutlets 3–5, ridged on the back; corymbs few-flowered; leaves subcoriaceous, yellow-green. *Intricatæ.*

Stamens 10; anthers yellow.

- Leaves ovate or oval . . . . . 18. BOYNTONI.

Stamens 15–20; anthers yellow.

- Leaves oval to ovate, acute . . . . . 19. VENUSTA.

Stamens 20; anthers dark purple.

Leaves ovate-oblong to elliptical . . . . . 20. SARGENTI.

Fruit large, red or yellow, conspicuously punctate; nutlets usually 5, prominently ridged on the back; corymbs many-flowered; stamens 20; anthers rose color (occasionally yellow in No. 21). *Punctatæ.*

Leaves obovate-cuneiform, prominently veined . . . . . 21. PUNCTATA.[2]

Leaves suborbicular to oval or rarely oblong . . . . . 22. SUBORBICULATA.

Fruit medium size, globose (subglobose in No. 25), red or yellow; nutlets 2 or 3, or 5, prominently ridged on the back; corymbs many-flowered, villose. *Collinæ.*

Stamens 20.

Leaves obovate to oval, acute; anthers pale yellow . . . . . 23. COLLINA.

Leaves rhombic to obovate; anthers rose color . . . . . 24. SORDIDA.

Leaves oval to obovate; anthers dark red . . . . . 25. BRAZORIA.

Stamens 10.

Leaves obovate to broadly oval; anthers white . . . . . 26. LETTERMANI.

Leaves obovate-oblong; anthers rose-colored . . . . . 27. PRATENSIS.

Fruit large, subglobose to pyriform, scarlet, often edible; nutlets usually 5, occasionally 4, thin, pointed at the ends, usually obscurely grooved or slightly ridged on the back; corymbs many-flowered, tomentose or pubescent; leaves broad, rounded, cordate or cuneate at the base. *Molles.*

Stamens 20.

Anthers light yellow.

Leaves broadly ovate, thick and firm . . . . . 28. MOLLIS.

Leaves oblong-ovate to oval, coriaceous . . . . . 29. ARKANSANA.

Leaves oblong-ovate, membranaceous . . . . . 30. SERA.

Leaves ovate, cuneate at the base . . . . . 31. CANADENSIS.

Leaves oblong-obovate to oval, cuneate at the base . . . . . 32. BERLANDIERI.

Anthers rose color.

Leaves broadly ovate, concave-cuneate at the base . . . . . 33. TEXANA.

Leaves oval to obovate, rounded or cuneate at the base . . . . . 34. QUERCINA.

Leaves oval to broadly ovate, cuneate at the base . . . . . 35. PYRIFORMIS.

Leaves ovate, lustrous, glabrous . . . . . 36. CORUSCA.

Stamens 10.

Anthers light yellow.

Leaves ovate, cuneate at the base . . . . . 37. SUBMOLLIS.

Leaves broadly ovate or oval, mostly rounded or truncate at the broad base . . . . 38. ARNOLDIANA.

Leaves ovate, mostly rounded or truncate at the broad base . . . . . 39. CHAMPLAINENSIS.

Anthers rose color.

Leaves ovate, acute, mostly broadly cuneate at the base . . . . . 40. ANOMALA.

Leaves oval, rounded or broadly cuneate at the base . . . . . 41. ELLWANGERIANA.

Leaves oval, rounded at the base . . . . . 42. PRINGLEI.

Fruit large, subglobose, scarlet; fruiting calyx much enlarged, prominent, the lobes dark red on the upper side toward the base; nutlets 5, ridged on the back; corymbs many or few-flowered, slightly villose; stamens 20; anthers rose color; leaves membranaceous, on vigorous shoots as broad or broader than long. *Dilatatæ.*

Leaves broadly ovate; corymbs broad, many-flowered . . . . . 43. DILATATA.

Leaves broadly ovate; corymbs compact, few-flowered . . . . . 44. COCCINIOIDES.

Fruit large to medium size, oblong, scarlet; nutlets 3–5, prominently grooved and usually ridged on the back; corymbs many-flowered, glabrous or tomentose; stamens 5–15. *Lobulatæ.*

Anthers dark purple.

Leaves ovate to oblong-ovate, acutely lobed, membranaceous, dark yellow-green . . 45. LOBULATA.

Leaves oval or ovate, thick and firm, pale yellow-green . . . . . 46. HOLMESIANA.

Leaves broadly ovate or oval, dark green, scabrate . . . . . 47. PEDICELLATA.

Leaves oval to obovate, acuminate . . . . . 48. SCABRIDA.

Fruit medium size, oblong (globose and greenish red in No. 52), crimson; nutlets 3–5, more or less ridged on the back; corymbs many-flowered, glabrous or villose; anthers dark red or rose color. *Tenuifoliæ.*

Stamens 20.

Leaves broadly ovate to oval . . . . . 49. LUCORUM.

Leaves rhombic to broadly ovate . . . . . 50. LACERA.

Stamens 5–10.

Leaves oval to ovate . . . . . 51. PENTANDRA.

Leaves ovate, acute . . . . . 52. SILVICOLA.

Fruit medium-sized, subglobose (large and oblong in No. 54); nutlets 2 or 3, conspicuously ridged on the back; corymbs many-flowered, glabrous or tomentose; leaves coriaceous or subcoriaceous, lustrous. *Coccineæ.*

Stamens 10.

Leaves elliptical to obovate; anthers yellow . . . . . 53. COCCINEA.

Leaves elliptical to ovate; anthers rose color . . . . . 54. JONESÆ.

Stamens 20.

Leaves broadly rhombic to oblong-obovate; anthers yellow . . . . . 55. MARGARETTA.

Fruit medium size or small, usually scarlet (sometimes orange-red in No. 56), nutlets 2 or 3, penetrated on each of the inner faces by a longitudinal cavity; corymbs many-flowered, glabrous or villose; calyx-lobes glandular-serrate (except in No. 60); leaves coriaceous (membranaceous in No. 56), mostly pubescent on the lower surface. *Tomentosæ.*

Anthers rose color.

Stamens 20.

Leaves ovate to ovate-oblong . . . . . 56. TOMENTOSA.[8]

Leaves elliptical, acute at the ends . . . . . 57. SUCCULENTA.

Leaves broadly oval or obovate . . . . . 58. GEMMOSA.

Stamens 10.

Leaves broadly obovate or oval . . . . . 59. ILLINOIENSIS.

Leaves broadly obovate to oval or rhomboidal . . . . . 60. INTEGRILOBA.

Anthers yellow.

Leaves broadly obovate to elliptical or oval . . . . . 61. MACRACANTHA.

Fruit large, red or orange-red; nutlets 3–5, ridged on the back; corymbs few or many-flowered, villose; bracts conspicuous; calyx-lobes foliaceous; stamens 20; anthers yellow. *Bracteatæ.*

Corymbs few-flowered.

Leaves broadly ovate or obovate . . . . . 62. ASHEI.

Corymbs many-flowered.

Leaves broadly oval to obovate . . . . . 63. HARBISONI.

Fruit large, globose, green or red; nutlets 5, slightly grooved on the back; corymbs one or few-flowered, tomentose; calyx-lobes foliaceous; stamens 20; anthers yellow. *Parvifloræ.*

Leaves obovate-spatulate . . . . . 64. UNIFLORA.

Leaves oval or rarely obovate, acute . . . . . 65. VAILIÆ.

Fruit medium size, globose or pyriform, green, orange or red; nutlets, 3–5, mostly ridged on the back; corymbs few-flowered, villose or tomentose (glabrous in No. 69); leaves, bracts, and inner bud-scales conspicuously glandular; branchlets usually strongly zigzag. *Flavæ.*

Stamens 20.

Anthers purple.

Leaves elliptical to obovate, usually acute . . . . . 66. FLAVA.

Leaves obovate to suborbicular . . . . . 67. CONSANGUINEA.

Anthers light yellow (Nos. 71 and 72 doubtful).

Leaves obovate-cuneiform . . . . . 68. FLORIDANA.

Leaves obovate-cuneiform, glabrous . . . . . 69. LACRIMATA.

Leaves obovate, rounded or short-pointed or acute . . . . . 70. RAVENELII.

Leaves obovate to orbicular . . . . . 71. DISPAR.

Leaves obovate to obovate-cuneiform . . . . . 72. SENTA.

Stamens 10.

Anthers yellow.

Leaves obovate to orbicular . . . . . 73. APRICA.

Fruit large, globose, æstival; nutlets 3–5, prominently ridged; corymbs few-flowered, glabrous; stamens 20; anthers purple. *Æstivales.*

Leaves elliptical to oblong-cuneiform . . . . . 74. ÆSTIVALIS.

MICROCARPÆ.

Fruit small, depressed-globose, scarlet; nutlets 2 to 5, ridged or grooved on the back; corymbs many-flowered, glabrous (villose in No. 77); stamens 20; anthers rose color or purple. *Eumicrocarpæ.*

Leaves broadly ovate to triangular . . . . . 75. CORDATA.[4]

Leaves spatulate to oblanceolate . . . . . 76. SPATHULATA.

Leaves orbicular to broadly ovate, pinnately 5–7-cleft . . . . . 77. APIIFOLIA.

Leaves oval to ovate or nearly orbicular . . . . . 78. OPIMA.

Fruit small (medium size in Nos. 83 and 84), globose; nutlets 3–5, slightly grooved on the back; corymbs few or many-flowered, glabrous; stamens 20; anthers pale yellow (No. 84 doubtful). *Virides.*

Leaves ovate to ovate-oblong or oblong-obovate . . . . . 79. VIRIDIS.

Leaves oval to ovate, acute . . . . . 80. VULSA.

Leaves oblong-ovate to semiorbicular, subcoriaceous . . . . . 81. GLABRIUSCULA.

Leaves oval to rhombic . . . . . 82. BLANDA.

Leaves lanceolate to oblanceolate, acuminate . . . . . 83. NITIDA.

Leaves ovate, acute . . . . . 84. ATRORUBENS.

[1] *Cratægus Douglasii*, iv. 86. The range of this species can now be extended to Clifton, near the shores of Lake Superior in Keweenaw County, in the extreme northern part of the upper peninsula of Michigan, where it is common on hills and bluffs, and where it was found in July, 1894, by Mr. O. A. Farwell; to Michipicoten Island in Lake Superior, where it was collected on July 24, 1869, by Mr. John Macoun (*teste* Herb. Gray); and to the shores of Thunder Bay, Michigan, where it was found in August, 1895, by Mr. C. F. Wheeler (*teste* Herb. Gray).

According to Meehan *Cratægus Douglasii* was discovered by Lewis and Clark on the Columbia River, April 29, 1806. (See *Proc. Phil. Acad.* 1898, 24 [*The Plants of Lewis and Clark's Expedition across the Country*, 1804–1806].)

Cratægus Douglasii, var. *rivularis*. The range of this tree can be extended eastward of the central divide in Wyoming to Caspar on a small tributary of the Platte River, to Paris Creek near the northern boundary of the state, and to the eastern slope of the Big Horn Mountains (*teste* Professor Aven Nelson).

[2] *Cratægus punctata*, iv. 103. The range of this species can now be extended westward to eastern Minnesota, where it was found by Mr. E. P. Sheldon at Lakeville, Dakota County, in May, 1894, and near Cedar Lake, Hennepin County, in May, 1895. It probably does not cross the Mississippi River.

[3] *Cratægus tomentosa*, iv. 101. The range of this species can be extended to southeastern Kansas. (See Hitchcock, *The Industrialist*, xxiv. 383 [*Flora of Kansas*].)

[4] *Cratægus cordata*, iv. 107. The range of this species can be extended to beyond the Mississippi River. It is common in southeastern Missouri, where it was found on Birch Tree Creek in Shannon County by Mr. B. F. Bush in 1893, and by Professor Trelease in 1897 between Bismarck and Iron Mountain in Iron County, and at Williamsville, Wayne County. It has been found by Mr. J. B. S. Norton at Osage, Missouri, on the Missouri River, and in northwestern Arkansas near Fayetteville by Professor F. L. Harvey.

CRATÆGUS SALIGNA.

Haw.

STAMENS 20; anthers yellow. Leaves narrow, rhombic or oval, acute or acuminate, subcoriaceous, dark green, and lustrous.

Cratægus saligna, Greene, *Pittonia*, iii. 99 (1896).

A tree, occasionally twenty feet in height, with a short stem and long slender spreading branches gracefully drooping at the ends; or often forming clumps or small thickets with numerous stems, from eight to fifteen feet tall, springing from one root. The bark of the large branches and small stems is close and bright red or reddish brown, and on old trunks it separates near the ground into long slightly attached narrow plate-like gray scales. The branchlets are slender and wand-like, marked by large scattered pale lenticels, and armed with thin ridged nearly straight bright chestnut-brown shining spines from three quarters of an inch to an inch and a half in length; when they appear they are orange color deeply tinged with red and soon become bright red and very lustrous, and dull red-brown in their second season. The leaves vary from narrowly rhombic to oval, and are gradually narrowed at the ends, and acute or acuminate and apiculate at the apex, entire toward the base, and finely serrate above, with incurved teeth tipped with minute bright red glands; they are nearly fully grown when the flowers open toward the middle of June, light yellow-green, covered on the upper surface with short pale hairs, and pale and glabrous below, with slender bright red petioles about a third of an inch in length, and usually furnished near the base with two or three large stipitate dark red caducous glands; at maturity the leaves are thick and firm in texture, dark green, glabrous and lustrous above, pale below, from an inch and a half to two inches long and from three quarters of an inch to an inch wide, with stout midribs rose-colored on the under side, particularly toward the base, very obscure forked veins, and reticulate veinlets. On vigorous leading shoots the leaves are lanceolate, acuminate, coarsely serrate, often deeply and irregularly divided into one or two pairs of acute lateral lobes, from three inches to three inches and a half long and from an inch and a quarter to an inch and a half wide; and their stipules are foliaceous, lunate, stalked, coarsely dentate, and often three quarters of an inch in length. Late in the autumn the leaves turn to brilliant shades of orange and bright scarlet. The flowers are about five eighths of an inch in diameter and are produced on short slender pedicels, in compact glabrous few or many-flowered compound corymbs, with linear glandular bright red bracts and bractlets. The calyx-tube is broadly obconic and glabrous, and the lobes are nearly triangular, entire, and often bright red toward the apex. There are twenty stamens with small yellow anthers, and five styles. The fruit, which ripens toward the end of September and sometimes remains on the branches at least as late as the middle of October, is borne on stout peduncles, in compact few-fruited drooping clusters, and is globose, a quarter of an inch in diameter, dull vinous red and very lustrous when fully grown, and ultimately blue-black; the calyx is small, with a narrow cavity and reflexed persistent lobes, and the flesh is thin, yellow, dry and sweet, and of a pleasant flavor. The five nutlets are thick, rounded and slightly ridged on the back, and about three sixteenths of an inch in length.

Cratægus saligna grows along the banks of the Cimmaron, Gunnison, and White rivers and other Colorado streams on both slopes of the continental divide at elevations varying from six thousand to eight thousand feet above the sea-level.[1]

[1] *Cratægus saligna* appears to have been first collected by Frémont in 1845 on his second transcontinental journey (No. 185 in Herb. Kew). It was collected by Hayden in 1869 (in Herb. Gray, without locality) and by Brandegee at Punch's Springs in August,

Late in the autumn, when the foliage has assumed its brilliant hues and the slender bright red branches droop under the weight of its abundant blue-black fruit, this Rocky Mountain Hawthorn enlivens the banks of mountain streams and is an object of striking and remarkable beauty.

1877 (in Herb. Gray). It has also been collected by Crandall in Gypsum Creek Cañon in August, 1894, and in the Black Cañon of the Gunnison in August, 1896, and June, 1899; by Beadle at Walcott on the Eagle River in July, 1896; by Sargent at Meeker on the White River plateau in October, 1896; by Purpus at Sapinero on the Elk Mountains in July, 1898; and by Jack at Grant, Park County, in October, 1898.

EXPLANATION OF THE PLATE.

PLATE DCXXXVI. CRATÆGUS SALIGNA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A fruiting branch, natural size.
4. Vertical section of a fruit, enlarged.
5. A nutlet, front view, enlarged.
6. The end of a vigorous shoot, natural size.

C.E.Faxon del. Rapine sc.

CRATÆGUS SALIGNA, Greene.

A.Riocreux direct.t Imr. J.Taneur, Paris.

CRATÆGUS CRUS-GALLI, var. PYRACANTHIFOLIA.

Cockspur Thorn.

STAMENS 10; anthers rose color. Leaves narrowly obovate, acute or sometimes rounded at the apex.

Cratægus Crus-galli, β pyracanthifolia, Aiton, *Hort. Kew.* ii. 170 (1789). — De Candolle, *Prodr.* ii. 626. — Torrey & Gray, *Fl. N. Am.* i. 464. — Loudon, *Arb. Brit.* ii. 820, f. 580. — Regel, *Act. Hort. Petrop.* i. 109 (in part). — Sargent, *Forest Trees N. Am.* 10*th Census U. S.* ix. 76; *Silva N. Am.* iv. 92.

Mespilus Crus-galli, var. **pyracanthifolia**, Hayne, *Dendr. Fl.* 80 (1882).

This form of the Cockspur Thorn, which has been known in European gardens for more than a century, has recently been found in eastern Pennsylvania and in northern Delaware and appears to range southward to Florida and middle Tennessee. It has the ten stamens and rose-colored anthers of *Cratægus Crus-galli*, but rather smaller flowers and smaller comparatively narrower and often bright red fruit. The leaves vary from elliptical to obovate and are acute or often rounded at the apex, and when young are sometimes slightly pubescent along the upper side of the midribs, a few hairs being also found occasionally on the young corymbs. Very distinct in its extreme forms, it appears to pass into the ordinary forms of *Cratægus Crus-galli*, which is distinguished by its larger leaves, mostly rounded at the apex except on vigorous shoots, larger flowers, and larger and usually pruinose fruits, and with the present knowledge of this narrower-leaved form it is perhaps best considered a variety.[1]

[1] The northeastern station of *Cratægus Crus-galli* is near Montreal in Quebec, where it was first noticed by Mr. J. G. Jack in August, 1892; it is rare in western Vermont (see Sargent, *Rhodora*, iii. 19), and with the exception of a few stations in Connecticut (E. B. Harger, East Haven, 1887, and Oxford, 1900, E. H. Eames, Stratford, 1895, C. B. Graves, Waterford and Groton, 1901) it is not known to grow naturally in other parts of New England. It grows probably naturally on the Shinnecock Hills and the shores of Peconic Bay, Long Island, where it was found in 1897 by Miss A. M. Vail, and is very abundant westward to Illinois and southward particularly in the Appalachian foothill region. West of the Missouri River, where there are a number of distinct species of this group, *Cratægus Crus-galli* either does not grow at all or varies constantly from the eastern tree in its yellow anthers.

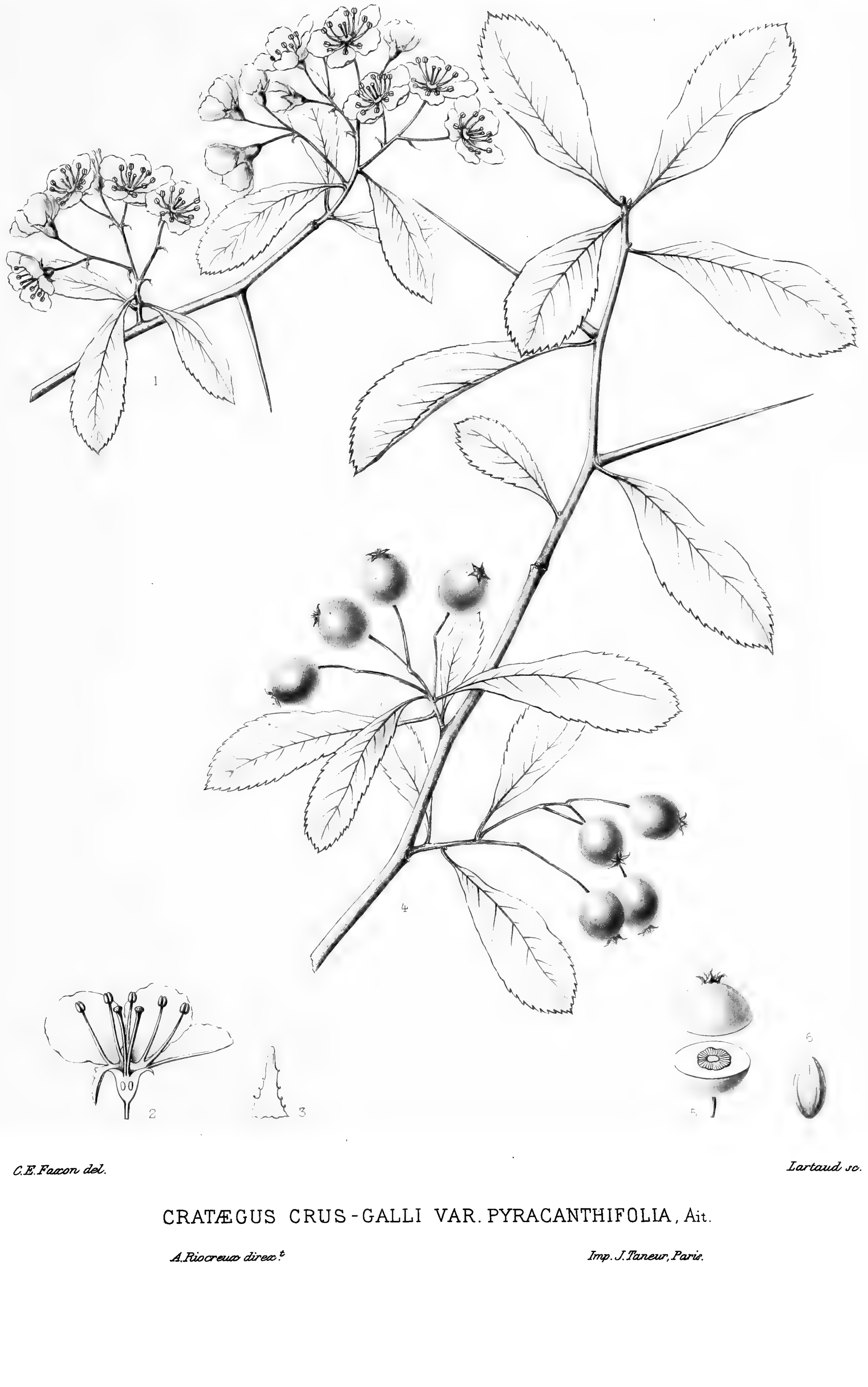
Another form of the Cockspur Thorn cultivated in Europe under the name of *Cratægus Crus-galli*, var. *salicifolia* (Aiton, *Hort. Kew.* ii. 170), with thinner narrower and more elongated lanceolate or oblanceolate leaves, has not yet been found growing naturally in this country, and, like a number of other peculiar plants in this group known only in European and American gardens, it is perhaps the product of cultivation or hybridization.

In the fourth volume of this work *Cratægus berberifolia* of Torrey & Gray of western Louisiana was considered a variety of *Cratægus Crus-galli*. It varies from that species in its twenty not ten stamens, in its thinner and less lustrous leaves, in the persistent pubescent or tomentose covering of the young branches, leaves, and calyx, and in its orange-colored red-cheeked fruit, and with the present idea of the limitation of species of Cratægus it should be considered a species.

EXPLANATION OF THE PLATE.

PLATE DCXXXVII. CRATÆGUS CRUS-GALLI, var. PYRACANTHIFOLIA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. A fruit divided transversely, enlarged.
6. A nutlet, rear view, enlarged.



C.E. Faxon del. *Lartaud sc.*

CRATÆGUS CRUS-GALLI VAR. PYRACANTHIFOLIA, Ait.

A. Riocreux direx.t *Imp. J. Taneur, Paris.*

CRATÆGUS CANBYI.

Haw.

STAMENS usually 10; anthers rose color. Leaves oblong or oval to ovate, usually acute, coriaceous.

Cratægus Canbyi, Sargent, *Bot. Gazette*, xxxi. 3 (1901).

A bushy glabrous or rarely slightly villose[1] tree, sometimes twenty feet in height, with a trunk from twelve to eighteen inches in diameter covered with thin dark brown bark broken into small closely appressed scales, and heavy ascending and wide-spreading branches which form a broad open irregular head occasionally from thirty to thirty-five feet across. The branchlets are stout, elongated, slightly zigzag, marked by numerous pale conspicuous lenticels, and sparingly armed with thick usually straight chestnut-brown spines from three quarters of an inch to an inch and a half in length. The leaves are oblong-ovate to ovate or rarely obovate, acute or rarely rounded at the apex, gradually narrowed, cuneate and entire at the base, and coarsely and doubly serrate above the middle, with glandular incurved teeth; they are thin but coriaceous at maturity, dark green and very lustrous above, pale and dull below, from two inches to two inches and a half long and from an inch to an inch and a half wide, with thick pale midribs and four or five pairs of remote primary veins impressed on the upper surface and raised and conspicuous on the lower surface; they are borne on stout petioles which are more or less winged above, grooved on the upper side, glandular, with scattered dark red persistent glands, red below the middle and from one half to three quarters of an inch in length. The stipules are oblong-obovate to linear-lanceolate, glandular-serrate, and generally about half an inch long. On vigorous leading shoots the leaves are often deeply and irregularly divided into broad acute lobes and are frequently three or four inches long and two inches wide. The flowers, which are five eighths of an inch in diameter and open about the middle of May, are produced in broad loose many-flowered long-branched compound corymbs, with linear finely glandular-serrate caducous bracts and bractlets. The calyx-tube is narrowly obconic and the lobes are entire, or serrate, with minute scattered glandular teeth, and mostly reflexed after the flowers open. There are usually ten but occasionally twelve or thirteen stamens with slender elongated filaments and small rose-colored anthers, and from three to five styles. The fruit ripens during the month of October but does not fall until after the beginning of winter; it hangs on elongated slender stems, in loose many-fruited drooping clusters, and is oblong to subglobose, full and rounded at the ends, with distinct depressions at the insertion of the stalks, lustrous, dark crimson, marked by occasional large pale lenticels, and from one half to five eighths of an inch in length; the calyx-cavity is deep but narrow, and the lobes are nearly entire, reflexed and closely appressed, and often deciduous before the fruit ripens; the flesh is thick, bright red, and very juicy. The nutlets vary from three to five in number and are prominently ridged, with broad rounded ridges, bright chestnut-brown, and about a quarter of an inch long.

Cratægus Canbyi grows in hedges and thickets in the neighborhood of Wilmington, Delaware, where it was first noticed in October, 1898, by Mr. William M. Canby;[2] and on the shores of Chesapeake

[1] Specimens of a plant collected by Mr. Alexander MacElwee on the shores of Chesapeake Bay at Perryville in Cecil County, Maryland, in May, 1899, which is not otherwise distinguishable from *Cratægus Canbyi*, have a few hairs scattered along the upper side of the midribs and slightly villose corymbs.

[2] William Marriott Canby (March 17, 1831) was born in Philadelphia, and was the son of a merchant of that city but a native of Wilmington, Delaware, where his family had lived since 1742. In that year it moved to Wilmington from Bristol, Pennsylvania, where the first of the family to come to America, a native of

Bay in Cecil County, Maryland. It grows also in the meadows of Tohickon Creek at Quakerstown, Pennsylvania, and on Tenicum Island, at Haddington, and at Gray's Ferry, Philadelphia.

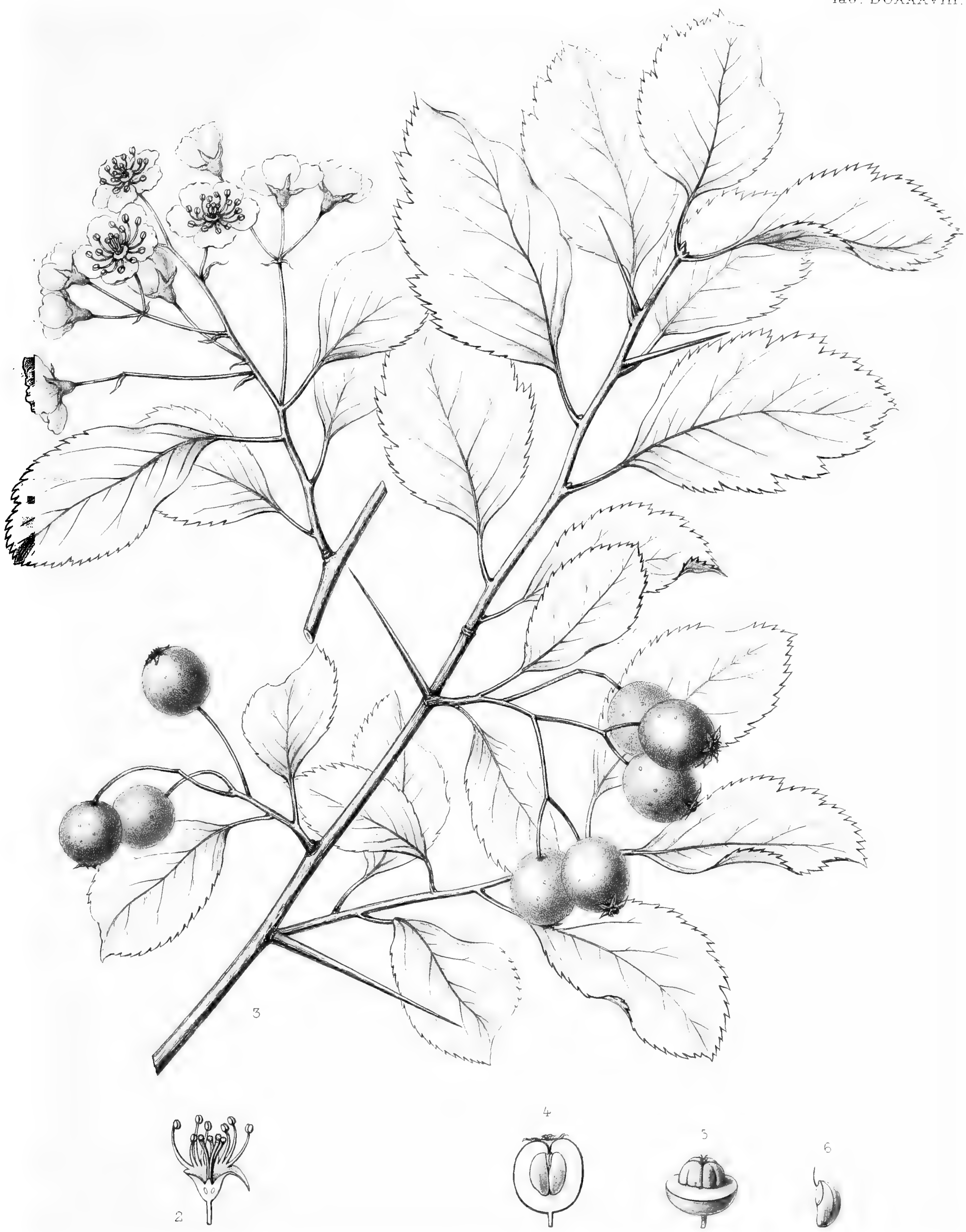
Yorkshire in England, had settled in 1680. William M. Canby was educated principally at Westhouse, the Friends' School near Chansford in Chester County, Pennsylvania, and by private tutors. He was brought up on a farm, and when he was twenty years old he began to manage a farm for himself. In 1866, fifteen years later, family affairs carried him to Wilmington. Since that time he has been principally occupied in various business affairs there, having been receiver and afterwards president of the Delaware Western Railroad, director in the Union National Bank, and for more than twenty years president of the Wilmington Saving Fund Society. He acquired a taste for botany early in life from relatives and afterward in school, and since 1858, when he visited Florida for the first time in search of health and began to gather plants, he has been an active and assiduous collector in many parts of the United States during long and frequent journeys, and his specimens, which have been distributed with a lavish hand, are found in all the large herbaria of the world. His own herbarium of about 30,000 species, the harvest of many years of work in the field, supplemented by liberal purchases and by exchanges, having outgrown the space at its disposal, is now in possession of the College of Pharmacy of New York; and since 1893 Mr. Canby has been engaged in forming an herbarium for the Natural History Society of Delaware, which now contains about 13,000 species.

Canbya, a genus of delicate and interesting annual plants of the Poppy family, natives of the deserts of the west, dedicated to him by his friend Asa Gray, will recall to botanists the name of Canby and his important and unselfish labors in increasing the knowledge of the American flora after the memory of his kindness, geniality, and helpfulness has passed with the generations of his friends and associates.

EXPLANATION OF THE PLATE.

PLATE DCXXXVIII. CRATÆGUS CANBYI.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A fruiting branch, natural size.
4. Vertical section of a fruit, natural size.
5. Cross section of a fruit showing the nutlets, natural size.
6. A nutlet, side view, enlarged.



C.E. Faxon del.

Rapine sc.

CRATÆGUS CANBYI, Sarg.

A. Riocreux direx.t

Imp. J Taneur, Paris

CRATÆGUS ENGELMANNI.

Haw.

STAMENS 10; anthers rose color. Leaves broadly obovate or elliptical, coriaceous, villose.

Cratægus Engelmanni, Sargent, *Bot. Gazette*, xxxi. 2 (1901).

Cratægus berberifolia, Britton, *Man.* 519 (in part) (not Torrey & Gray) (1901).

A tree, from fifteen to twenty feet in height, with a trunk five or six inches in diameter covered with dark red-brown scaly bark, and wide-spreading usually horizontal branches forming a low flat-topped or a rounded head; or occasionally shrubby. The branchlets are slender, straight or somewhat zigzag, marked by large pale lenticels, and armed with few thin straight or slightly curved chestnut-brown lustrous spines from an inch and a half to two inches and a half in length; when they first appear they are orange-brown or green tinged with red and covered with long pale hairs which soon disappear, and during their first summer they are nearly glabrous and bright red-brown, becoming lighter colored and gray or gray tinged with red during their second year. The leaves are broadly obovate or rarely elliptical, rounded or often short-pointed and acute at the apex, gradually narrowed or entire below, and finely crenulate-serrate usually only above the middle and generally only at the apex; nearly fully grown when the flowers open about the middle of May, they are then roughened above by short rigid pale hairs, and at maturity they are coriaceous, dark green, lustrous, and scabrous on the upper surface, pale on the lower surface, pilose above and below along the slender midribs and on the obscure primary veins and veinlets, from an inch to an inch and a half long and from half an inch to an inch wide; they are borne on slender grooved glandular petioles winged above by the decurrent bases of the leaf-blades, at first slightly villose but soon glabrous, and usually about a quarter of an inch in length. The stipules are linear-lanceolate, glabrous, light red, one third of an inch long, and caducous. The flowers, which are three quarters of an inch in diameter, are produced on slender pedicels, in broad loose eight to twelve-flowered thin-branched villose corymbs, with linear-lanceolate or narrowly obovate tomentose or villose glandular-serrate bracts and bractlets. The calyx-tube is narrowly obconic, villose, or nearly glabrous, and the lobes are narrow, acuminate, entire, glabrous on the outer surface, usually puberulous on the inner surface, and reflexed after the flowers open. There are ten stamens with long slender filaments and small rose-colored anthers, and two or three styles. The fruit, which ripens early in November, hangs on slender pedicels, in drooping many-fruited glabrous clusters; it is globose or short-oblong, bright orange-red, with a yellow cheek, and about a third of an inch in diameter; the calyx is prominent, with a broad shallow cavity, and enlarged spreading lobes which usually fall before the fruit ripens; the flesh is thin, green, dry, and mealy. The two or three nutlets are thick, prominently ridged on the back, with high rounded ridges, and a quarter of an inch long.

Cratægus Engelmanni inhabits dry limestone slopes and ridges, and is common through central and southern Missouri.[1] Long confounded with *Cratægus Crus-galli*, it appears to have been first collected at Kimmswick at the mouth of the Maramec River by Dr. George Engelmann.

[1] The first description of *Cratægus Engelmanni* was made to include a number of specimens of Crus-galli-like species with more or less pilose leaves and villose corymbs collected at West Nashville, Tennessee, in northern and central Alabama, and at Rome and Augusta, Georgia. The specimens from Nashville have since been referred by Mr. C. D. Beadle to his *Cratægus sinistra* (*Biltmore Bot. Studies*, i. 44 [1901]); and further study in the field is needed before it can be satisfactorily determined whether any of the forms of the Crus-galli group growing east of the Mississippi River belong with *Cratægus Engelmanni*.

EXPLANATION OF THE PLATE.

PLATE DCXXXIX. CRATÆGUS ENGELMANNI.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A fruiting branch, natural size.
4. A fruit divided transversely, enlarged.
5. A nutlet, front view, enlarged.
6. A nutlet, rear view, enlarged.

C.E.Faxon del.

Lartaud sc.

CRATÆGUS ENGELMANNI, Sarg.

A.Riocreux direx.t

Imp. J.Taneur, Paris.

CRATÆGUS PEORIENSIS.

Haw.

STAMENS 10; anthers rose color. Leaves obovate, usually acute, coriaceous, dark green, and lustrous.

Cratægus Peoriensis, Sargent, *Bot. Gazette*, xxxi. 5 (1901).

A nearly glabrous tree, usually from twenty to twenty-five feet in height, with a trunk occasionally a foot in diameter covered with dark brown scaly bark, and stout spreading branches forming a broad flat-topped symmetrical head. The branchlets are slender, somewhat zigzag, marked by numerous small pale lenticels, and armed with straight or slightly curved thin dull chestnut-brown spines from two inches to two inches and a half in length; green more or less tinged with red when they first appear, they become light orange-brown and lustrous during their first season, lighter colored during their second year, and ultimately ashy gray. The leaves are obovate, short-pointed or occasionally rounded at the broad apex, gradually narrowed, cuneate, and entire below, sharply and often doubly serrate, usually only above the middle, with straight or incurved glandular teeth, and sometimes irregularly lobed, with short broad terminal lobes; when they unfold they are villose on the upper surface, particularly toward the base of the midribs, and are bright bronze color, and when the flowers open during the latter part of May they are nearly fully grown and still slightly villose; in the autumn they are thick and firm, glabrous, dark green and very lustrous on the upper surface and pale on the lower surface, an inch and a half to two inches long and three quarters of an inch wide, with four or five pairs of thin primary veins raised and conspicuous on the under side, deeply impressed on the upper side, and extending very obliquely from the slender midribs to the ends of the lobes; they are borne on broad deeply grooved petioles usually about a quarter of an inch in length, more or less wing-margined and slightly glandular above the middle, and covered early in the season with short pale deciduous hairs. The stipules are linear-lanceolate, glandular-serrate, and caducous. On vigorous leading shoots the leaves are sometimes deeply divided into broad acute lateral lobes, and are from two to three inches long and an inch and a half wide, and their stipules are foliaceous, lunate, coarsely glandular-serrate, and sometimes an inch in length. The flowers are cup-shaped and about half an inch in diameter, and are borne on slender elongated pedicels, in broad loose compound many-flowered thin-branched glabrous corymbs, with linear conspicuously glandular caducous bracts and bractlets. The calyx-tube is narrowly obconic, and the lobes are narrow, acuminate, entire or irregularly glandular-serrate, with minute scattered dark red glands, pubescent below the middle on the upper surface, and spreading or reflexed when the flowers open. There are ten stamens with slender elongated filaments and small rose-colored anthers, and two or three styles surrounded at the base by a narrow ring of pale tomentum. The fruit ripens early in October, and hangs in drooping many-fruited clusters, on slender elongated pedicels; it is oblong or obovate, full and rounded at the ends, slightly depressed at the insertion of the stalk, bright scarlet marked by many small dark dots, and from one half to three quarters of an inch in length; the calyx-cavity is broad and deep, and the enlarged lobes are usually erect and incurved and persistent; and the flesh is thick, nearly white, firm, and dry. The two or rarely three nutlets are thick, prominently ridged on the back, with broad rounded ridges, and about a quarter of an inch long.

Cratægus Peoriensis grows in open woods by the moist borders of streams and depressions in the

prairie and on hillsides in clay soils in Short and Peoria counties, Illinois, where it was discovered in September, 1897, by Mr. Virginius H. Chase.[1]

[1] Virginius Heber Chase (January 8, 1876), a great-grandson of Philander Chase, the first Episcopal bishop of Ohio and Illinois and the founder of Kenyon College, Ohio, and of Jubilee College, Jubilee, Illinois, was born at Wady Petra, Illinois, where he has been a telegraph operator since 1893, devoting his spare time to good advantage in studying the plants of central Illinois, where he has discovered and distinguished three interesting species of Cratægus.

EXPLANATION OF THE PLATE.

PLATE DCXL. CRATÆGUS PEORIENSIS.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A fruiting branch, natural size.
4. A fruit divided transversely, enlarged.
5. A nutlet, front view, enlarged.
6. A nutlet, rear view, enlarged.

C.E. Faxon del. *Lartaud sc.*

CRATÆGUS PEORIENSIS, Sarg.

A. Riocreux direx.t *Imp. J. Taneur, Paris.*

CRATÆGUS FECUNDA.

Haw.

STAMENS usually **10**; anthers dark purple. Leaves oblong-obovate to oval or broadly ovate, thin, lustrous, coarsely serrate.

Cratægus fecunda, Sargent, *Bot. Gazette*, xxxiii. 111 (1902).

A tree, from twenty to twenty-five feet in height, with a trunk ten or twelve inches in diameter covered with thin bark broken into small closely appressed dark red-brown scales, and stout wide-spreading branches forming a broad symmetrical round-topped rather open head. The branchlets are stout, slightly zigzag, marked by large pale oblong lenticels, and armed with numerous very slender straight or slightly curved chestnut-brown shining spines which vary from two to two and a half inches in length; covered when they first appear with soft matted pale hairs, they become during their first summer glabrous, lustrous, and light orange-green, and ashy gray in their second season. The leaves vary from oblong-obovate to oval or broadly ovate, and are acute, or rarely rounded and short-pointed at the apex, gradually or abruptly narrowed below, and coarsely and usually doubly serrate, with broad spreading glandular teeth except toward the base, which is ciliate with short scattered pale hairs; when they unfold they are dark green, lustrous, and roughened on the upper surface by short pale appressed caducous hairs, and on the lower surface pale yellow-green, and villose along the midribs and primary veins, with occasional white hairs; at maturity the leaves are thin but firm in texture, dark green and lustrous above, pale yellow-green below, from two to two and a half inches in length and from one inch and a half to two inches in width, with stout midribs and remote primary veins only slightly impressed on the upper surface and after midsummer often bright red below; they are borne on stout more or less winged petioles which are grooved on the upper side, often glandular, coated with pale hairs when they first appear but soon glabrous, dull red at maturity, and from one half to three quarters of an inch long. The stipules are linear-lanceolate to narrowly obovate, and glandular-serrate. On vigorous leading shoots the leaves are often slightly lobed with short broad acute lobes, and appear convex by the hanging down of the margins; they are from three to four inches long and from two to three inches broad, and their stipules are semilunate, coarsely glandular-serrate, and frequently three quarters of an inch in length. Late in the autumn the leaves turn to brilliant shades of orange and scarlet or assume a deep rich bronze color. The flowers, which are three quarters of an inch in diameter, open at the end of May and are borne in wide many-flowered compact slightly villose compound corymbs, with linear or oblong-obovate coarsely glandular-serrate bracts and bractlets. The calyx-tube is narrowly obconic and more or less villose, and the lobes are elongated, acute, and coarsely glandular-serrate, with stipitate dark red glands villose on the inner surface. There are usually ten but occasionally from twelve to fifteen stamens with small dark purple anthers, and two or three styles. The fruit ripens at the end of October and hangs on slender pedicels, which are often half an inch in length, in broad many-fruited drooping clusters; it is short-oblong to subglobose, full and rounded at the ends, covered until nearly fully grown with long soft pale hairs, and at maturity dull orange-red marked by many small dark dots, and from seven eighths of an inch to an inch in length; the calyx-cavity is deep but comparatively narrow, and the lobes are linear-lanceolate, erect and incurved, coarsely glandular-serrate above the middle, and dark red on the upper side toward the base; the flesh is very thick, firm and hard, pale green, dry, and sweet. The two or three nutlets are light-colored, rounded and prominently ridged on the back, and one third of an inch long.

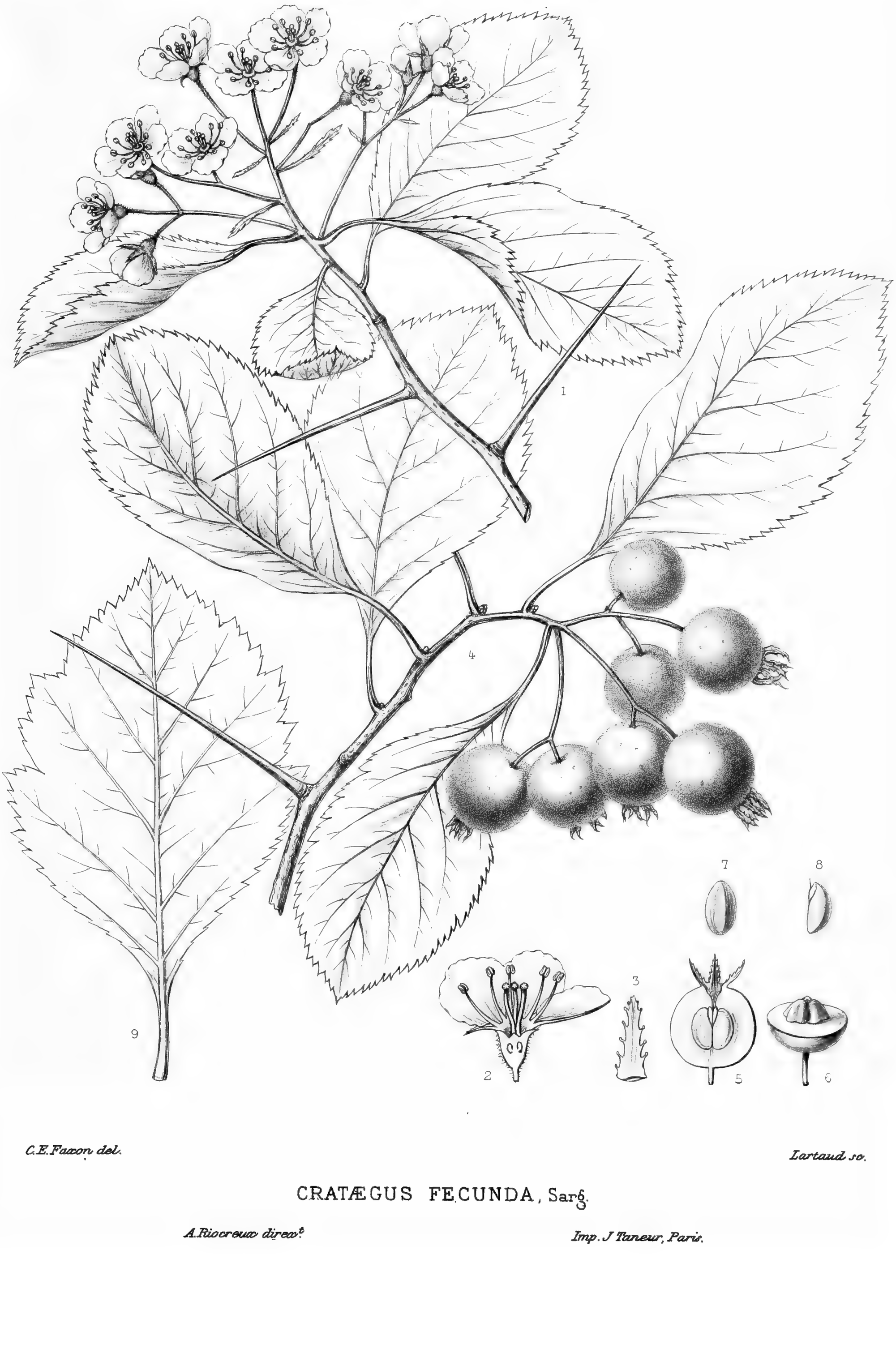
Cratægus fecunda grows in rich woodlands near Allenton, Missouri, where it was first noticed in September, 1882, by Mr. George W. Letterman, and on the bottom-lands of the Mississippi River in Illinois opposite St. Louis.

For many years this tree has inhabited the Arnold Arboretum, where it was raised from seeds collected by Mr. Letterman, and where in the autumn, when it is covered with its large showy fruits and lustrous brilliant leaves, it is a magnificent object.

EXPLANATION OF THE PLATE.

PLATE DCXLI. CRATÆGUS FECUNDA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, natural size.
6. Cross section of a fruit, showing the nutlets, natural size.
7. A nutlet, rear view, enlarged.
8. A nutlet, side view, enlarged.
9. A leaf of a vigorous leading shoot, natural size.



C.E. Faxon del. *Lartaud sc.*

CRATÆGUS FECUNDA, Sarg.

A. Riocreux direx.t *Imp. J. Taneur, Paris.*

CRATÆGUS ERECTA.

Haw.

STAMENS usually 10; anthers pale yellow. Leaves oval to obovate, acute, thin, dull green.

Cratægus erecta, Sargent, *Bot. Gazette*, xxxi. 218 (1901).

A nearly glabrous tree, usually from twenty-five to thirty feet in height, with a trunk a foot in diameter, but occasionally much larger, and thick ascending branches which form a wide open but rather symmetrical head.[1] The bark of the trunk is divided irregularly into thick plate-like scales, and is dark gray-brown, or nearly black near the base of large trees. The branchlets are spreading, slender, slightly zigzag, marked by numerous large oblong pale lenticels, and armed with thin straight chestnut-brown spines from one to two inches in length; more or less tinged with red when they first appear, they are orange or reddish brown during their first season and gray or gray-brown during their second year. The leaves are oval or obovate, or on leading vigorous shoots nearly orbicular, acute and short-pointed at the apex, cuneate and entire at the base, and finely glandular-serrate; when they unfold they are often villose, with a few short caducous pale hairs on the upper side of the midribs, and are nearly fully grown and dull green when the flowers open; in the autumn they are thin but firm in texture, dark dull green on the upper surface, pale on the lower surface, from an inch and a half to two inches long and from an inch to an inch and a quarter wide, with slender midribs and thin but prominent primary veins; they are borne on slender deeply grooved petioles which are often wing-margined above, glandular, with minute dark glands, usually dark red after midsummer, and from one quarter to one half of an inch in length. The stipules are linear, glandular-serrate, about half an inch long, caducous, and turn red before falling. On vigorous leading shoots the leaves are coarsely dentate, with broad nearly straight glandular teeth, and are sometimes three inches long and two inches and a half wide. In the autumn the leaves become a dull orange color. The flowers, which vary from one half to five eighths of an inch in diameter and open about the tenth of May, are produced in broad loose many-flowered very thin-branched compound corymbs, with linear glandular-serrate caducous bracts and bractlets. The calyx-tube is narrowly obconic, and the lobes are narrow, elongated, acuminate, entire, or occasionally obscurely and irregularly serrate. There are usually ten but occasionally from eleven to thirteen stamens with slender filaments and small pale yellow anthers, and three or four styles which are surrounded at the base by a narrow ring of short pale hairs. The fruit is borne in few-fruited drooping clusters, on slender elongated pedicels; it is subglobose and usually a little longer than broad, full and flattened at the ends, dark dull crimson, marked by occasional dark-colored dots, and from one quarter to one third of an inch in length; the calyx-tube is short, with a broad shallow cavity and closely appressed lobes which are gradually narrowed from broad bases and are usually persistent on the ripe fruit; the flesh is thin, yellow, dry, and mealy. The three or four nutlets are broad, prominently and doubly ridged on the back, and about three sixteenths of an inch long.

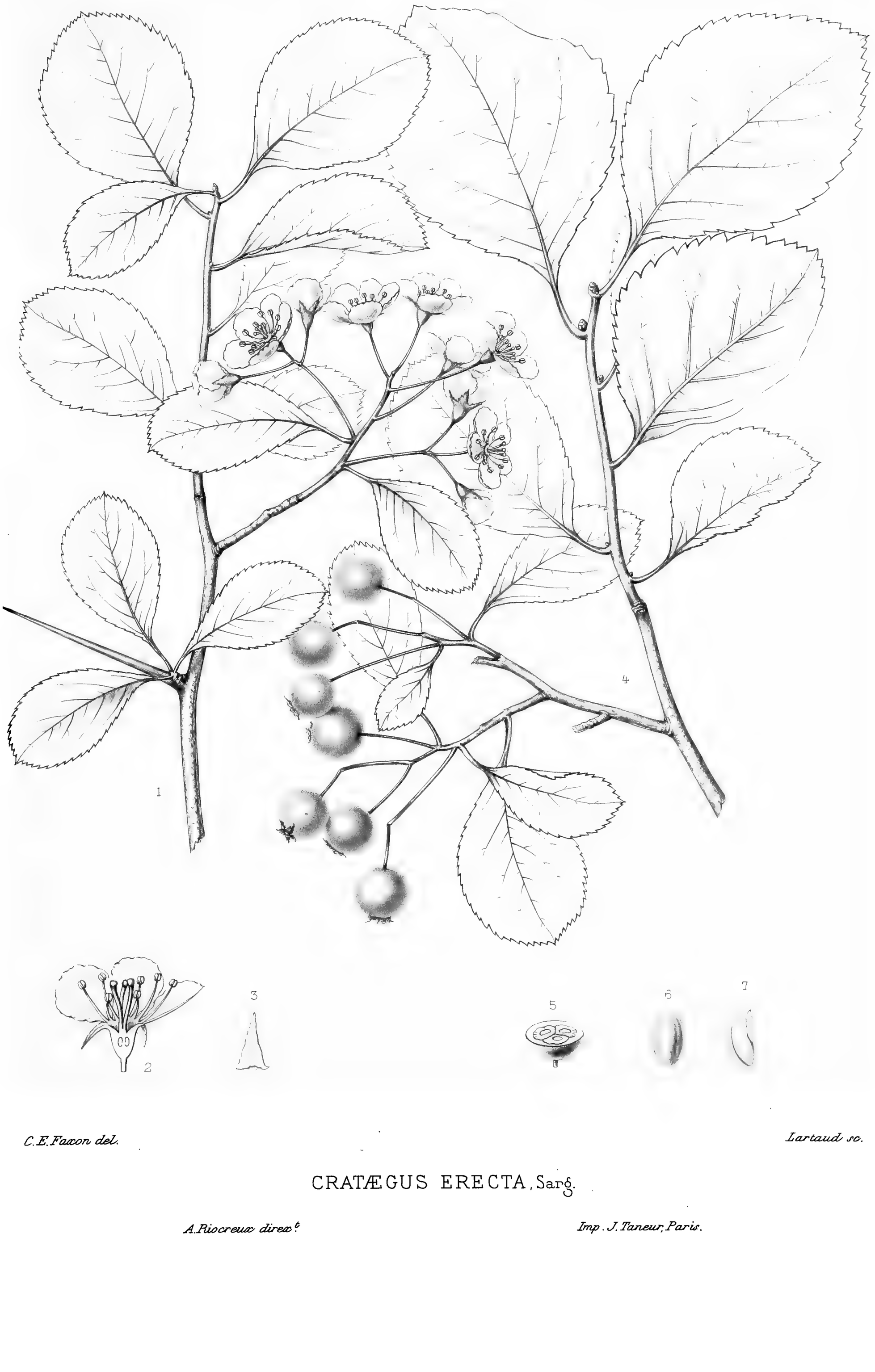
Cratægus erecta inhabits the rich bottom-lands of the Mississippi River in Illinois opposite the city of St. Louis, where it was first noticed by me in October, 1899, and where it is common at least as far south as Fish Lake.

[1] In a field near Fish Lake, four miles south of the village of Cahokia, Illinois, there is a tree of *Cratægus erecta* which is at least forty feet in height, with a trunk now somewhat injured where it divides into a number of large ascending branches, which is three feet in diameter at a point three feet above the surface of the ground.

EXPLANATION OF THE PLATE.

PLATE DCXLII. CRATÆGUS ERECTA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Cross section of a fruit, enlarged.
6. A nutlet, rear view, enlarged.
7. A nutlet, side view, enlarged.



C.E.Faxon del. *Lartaud sc.*

CRATÆGUS ERECTA, Sarg.

A.Riocreux direx.t *Imp. J.Taneur, Paris.*

CRATÆGUS ACUTIFOLIA.

Haw.

STAMENS 10; anthers pale yellow. Leaves oval to oblong-obovate, acuteor acuminate, thin, and lustrous.

Cratægus acutifolia, Sargent, *Bot. Gazette*, xxxi. 217 (1901).

A nearly glabrous tree, often thirty feet in height, with a trunk eighteen inches in diameter, and stout wide-spreading branches forming a symmetrical round-topped rather open head. The bark of the trunk is thin, dark reddish brown, and broken into thick closely appressed scales. The branchlets are slender, usually straight, marked by oblong pale lenticels, and occasionally armed with scattered thin straight chestnut-brown spines which vary from one to nearly two inches in length; during their first year they are dark chestnut-brown or orange-brown, and in their second season dull gray-brown. The leaves vary from oval to oblong-obovate, and are acute or acuminate or rarely rounded at the apex, cuneate at the usually entire base, and finely crenulate-serrate often only above the middle, with gland-tipped teeth; when the flowers open they are nearly fully grown, membranaceous, and lustrous above, with occasional short scattered pale caducous hairs along the upper side of the midribs, and at maturity they are thin and firm in texture, dark green and lustrous on the upper surface, pale yellow-green on the lower surface, about an inch and a half long and an inch wide, with slender light yellow midribs comparatively deeply impressed above and four or five pairs of thin slightly raised primary veins; they are borne on slender deeply grooved petioles which are more or less winged above, glandular when they first appear, with minute dark caducous glands, and from one quarter to one half of an inch in length. The stipules are linear, elongated, glandular-serrate, and caducous. On vigorous leading shoots the leaves are frequently divided toward the apex into two or three pairs of short acute lobes, and are often three inches long and two inches broad. The flowers, which are half an inch in diameter, open about the tenth of May and are borne on slender pedicels, in compound many-flowered compact corymbs, with linear glandular-serrate bracts and bractlets. The calyx-tube is narrowly obconic and the lobes are lanceolate, acuminate, and entire or obscurely and irregularly glandular-serrate, with minute stipitate dark glands. There are ten stamens with small pale yellow anthers, and two or three styles. The fruit ripens and falls at the end of September and hangs on slender pedicels from one half to three quarters of an inch in length, in few-fruited drooping clusters; it is oblong, full and rounded at the ends, bright scarlet, marked by occasional large dark dots, and about half an inch long; the calyx-tube is prominent, with a broad deep cavity, and the lobes, which are reflexed and closely appressed, are often deciduous before the fruit ripens; the flesh is thin, yellow, dry, and mealy. The two or three nutlets are thick, prominently ridged on the back, with broad rounded ridges, and about three sixteenths of an inch in length.

Cratægus acutifolia inhabits bluffs on the Mississippi River in South St. Louis, Missouri, where it grows in open Oak woods and where it appears to have been first collected in May, 1887, by Mr. Henry Eggert.[1]

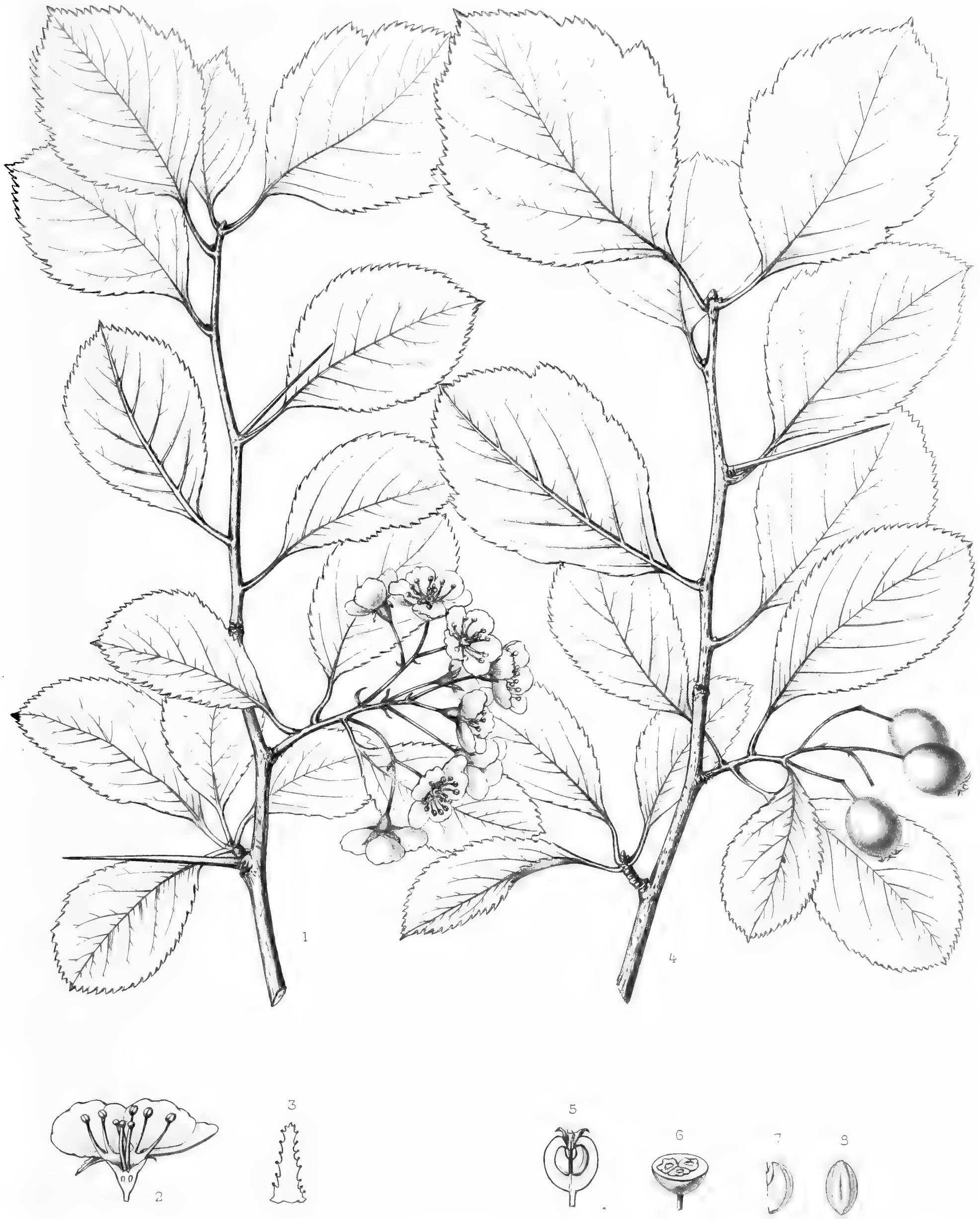
[1] Heinrich Karl Daniel Eggert (March 3, 1841) was born at Osterwieck in Prussia. He was educated at the seminary in Halberstadt, and became a teacher in the public schools in the neighboring city of Magdeburg. He early became interested in the study of plants, and before leaving Europe he had made botanical collections in the Harz Mountains and on short journeys to Kreuznach and in Bohemia. Dissatisfied with the small salary of a German school-teacher, Eggert came to America in 1873, and for a few months worked on a farm in southern New York. From New York he went to St. Louis, and for nearly twenty years devoted

himself to unremitting labor in distributing newspapers, by which he secured a competence sufficient to enable him in recent years to devote his time to the collection and study of plants. Stimulated by the advice and assistance of Dr. George Engelmann, who became his friend soon after his arrival in St. Louis, Eggert explored the flora of the immediate neighborhood of the city during the early years of his residence in St. Louis, and at this time collected large quantities of the seeds of the native Grape-vines to stock European vineyards ravaged by the Phylloxera. After retiring from business Mr. Eggert made several annual journeys to southern Missouri and Arkansas and to Texas and the southeastern United States, and has discovered several interesting plants.

EXPLANATION OF THE PLATE.

PLATE DCXLIII. CRATÆGUS ACUTIFOLIA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, natural size.
6. Cross section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.



C.E.Faxon del.

Himely sc.

CRATÆGUS ACUTIFOLIA, Sarg.

A.Riocreux dirext

Imp. J.Taneur, Paris.

CRATÆGUS SIGNATA.

Haw.

STAMENS 10. Leaves obovate, rounded or acute, thin, bright green, and lustrous.

Cratægus signata, Beadle, *Biltmore Bot. Studies*, i. 42 (1901).

Cratægus Crus-galli, var. **berberifolia**, Sargent, *Silva N. Am.* iv. 93 (in part) (not Torrey & Gray) (1892).

Cratægus elliptica, Mohr, *Contrib. U. S. Nat. Herb.* vi. 550 (*Plant Life of Alabama*) (not Aiton) (1901).

A tree, usually from fifteen to eighteen feet in height, with a tall stem four or five inches in diameter covered with ashy gray bark, which is often nearly black near the base of old stems, and separates freely into thin plate-like scales displaying when they fall the bright red inner bark, and many ascending or spreading branches forming a round-topped or oval compact head. The branchlets are stout, more or less zigzag, marked by numerous large pale lenticels, and armed with stout nearly straight bright chestnut-brown spines from one to two inches in length; when they first appear they are dark green tinged with red and covered with long white matted hairs; soon becoming glabrous, they are bright reddish brown during their first season, dull gray-brown during their second year, and ultimately ashy gray. The leaves are obovate, rounded and often short-pointed or acute at the apex, gradually narrowed from near the middle and cuneate at the entire base, and sharply glandular-serrate generally only above the middle; when the flowers open early in April they are usually only half grown and are then gray-green, and coated on the upper surface and on the lower side of the midribs and principal veins with short pale hairs; and at maturity they vary from an inch and a half to two inches in length and from three quarters of an inch to an inch in width, and are thin but firm in texture, dark green, lustrous, and slightly pilose on the upper surface, paler and pubescent below along the slender midribs and the two to five pairs of primary veins which extend toward the apex of the leaf; they are borne on slender glandular grooved petioles winged above by the decurrent bases of the leaf-blades, and usually about a third of an inch in length. The stipules are linear, coarsely glandular-serrate, bright red before falling, and caducous. On leading shoots the leaves are often broadly oval, more coarsely dentate than the leaves of lateral branchlets, sometimes incisely lobed, and frequently two inches and a half long and two inches wide, and their stipules are foliaceous, lunate, and coarsely glandular-dentate. The flowers are about three quarters of an inch in diameter and bad-smelling, and are produced on slender pedicels coated with pale matted hairs, like the branches of the compound few-flowered compact corymbs and their linear glandular-serrate bracts and bractlets. The calyx-tube is narrowly obconic and villose, with long matted hairs, and the lobes are narrow, acute, entire or irregularly glandular-serrate, usually glabrous on the outer surface, villose on the inner surface, and reflexed after the flowers open. There are ten stamens with slender filaments and small anthers, and from three to five styles surrounded at the base by a few pale hairs. The fruit ripens and falls toward the end of October and is borne in few-fruited drooping slightly villose clusters; it is oblong, full and rounded at the ends, dark red, more or less pruinose, marked by numerous large pale dots, and about half an inch long; the calyx is prominent, with a deep narrow cavity and elongated closely appressed lobes which are usually persistent on the ripe fruit; the flesh is thin, yellow, dry, and insipid. The nutlets vary from three to five in number and are prominently ridged and grooved on the back, and about a quarter of an inch in length.

Cratægus signata inhabits open glades and dry copses of the Pine-covered coast plain of southern Alabama, where it is common in Washington and Mobile counties. Discovered many years ago by Dr. Charles Mohr, it has been variously considered one of the forms of the flava group and as a variety of *Cratægus Crus-galli* until its true characters were determined by Mr. C. D. Beadle.

EXPLANATION OF THE PLATE.

PLATE DCXLIV. CRATÆGUS SIGNATA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, natural size.
6. Cross section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.

C.E. Faxon del. *Lartaud sc.*

CRATÆGUS SIGNATA, Bead.

A. Riocreux direx.t *Imp. J. Taneur, Paris.*

CRATÆGUS BUSHII.

Haw.

STAMENS 20; anthers rose-colored. Leaves obovate to elliptical, broad and rounded or acute at the apex.

Cratægus Bushii, Sargent, *Bot. Gazette*, xxxiii. 109 (1902).

A tree, from fifteen to twenty feet in height, with a trunk eight or ten inches in diameter covered with dark red-brown fissured bark broken on the surface into closely appressed scales, and small spreading branches forming a broad open irregular head. The branchlets are slender, nearly straight, marked by occasional oblong pale lenticels, and unarmed or sparingly armed with stout straight chestnut-brown spines varying from an inch and a half to an inch and three quarters in length; when they first appear they are orange-green and glabrous, becoming bright red-brown and lustrous during their first season and dull gray-brown in their second year. The leaves are obovate, broad and rounded or acute at the apex, or elliptical and acute, gradually narrowed from near the middle, cuneate and entire at the base, and coarsely serrate above, with straight gland-tipped teeth; when they unfold they are dark green above, pale below, and villose, with short white hairs on both sides of the midribs and veins; nearly fully grown when the flowers open about the twentieth of April, they are then dark green and very lustrous on the upper surface and glabrous, with the exception of a few hairs on the upper side of the midribs, and at maturity they are coriaceous, very lustrous, glabrous, from an inch and a quarter to an inch and a half in length and from half an inch to an inch in width, with stout yellow midribs deeply impressed above and few slender prominent primary veins; they are borne on stout grooved villose ultimately glabrous petioles margined above and usually about half an inch long. The stipules are linear-lanceolate or oblanceolate, glandular-serrate or entire, about a quarter of an inch long, and caducous. On vigorous leading shoots the leaves are usually elliptical, acute, coarsely serrate, and frequently three inches long and an inch and a half wide, with stouter and more broadly winged petioles than those of the leaves of fertile branches. The flowers vary from three quarters of an inch to an inch in diameter and are produced in broad compound many-flowered glabrous corymbs, with linear entire caducous bracts and bractlets. The calyx-tube is broadly obconic and glabrous, and the lobes are elongated, linear-lanceolate, entire or occasionally slightly dentate, and reflexed after anthesis. There are twenty stamens with large bright rose-colored anthers, and two or three styles surrounded at the base by conspicuous tufts of white hairs. The fruit, which ripens late in October or in November, is borne on slender pedicels about half an inch long, in few-fruited drooping clusters; it is oblong, full and rounded at the ends, green tinged with dull red, and a third of an inch in length, with a broad shallow calyx-cavity and only slightly enlarged erect and incurved lobes which mostly fall before the fruit ripens; the flesh is thin, green, dry, and hard. The two or three nutlets are broad, prominently ridged on the back, with high rounded ridges, and a quarter of an inch long.

Cratægus Bushii inhabits rich upland woods near Fulton on the Red River in southern Arkansas, where it was discovered in April, 1900, by Mr. B. F. Bush.[1]

This tree, one of the most beautiful of the American Thorns, with its large and abundant pure white flowers and lustrous leaves, is fittingly associated with the name of its discoverer, who for many years has industriously explored the forests and prairies of the region immediately west of the lower Mississippi River.

[1] See vii. 110.

EXPLANATION OF THE PLATE.

PLATE DCXLV. CRATÆGUS BUSHII.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, natural size.
6. Cross section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.
9. A leaf of a small-leaved form, natural size.

C.E. Faxon del. *Lartaud sc.*

CRATÆGUS BUSHII, Sarg.

A. Riocreux direx.t *Imp. J. Taneur, Paris.*

CRATÆGUS EDITA.

Haw.

STAMENS 20; anthers rose-colored. Leaves oblong-obovate, acute, scabrous.

Cratægus edita, Sargent, *Bot. Gazette*, xxxiii. 110 (1902).

A tree, in low moist ground sometimes forty feet in height, with a trunk a foot in diameter free of branches for eighteen or twenty feet and covered with dark red-brown fissured scaly bark, and stout horizontal branches forming a broad rounded symmetrical head; or on the drier soil of low hills much smaller and generally from twenty to twenty-five feet in height. The branchlets are slender, nearly straight, marked by numerous large oblong dark lenticels, and armed with few scattered stout straight chestnut-brown ultimately dull gray spines which vary from one to two inches in length; when they first appear the branchlets are orange-brown and villose, and in their second year they are dull red-brown and often sparingly villose, becoming dull light gray-brown during the following year. The leaves are oblong-obovate or rarely oval, acute at the gradually narrowed apex, gradually narrowed from near the middle and cuneate at the entire base, and coarsely and often doubly serrate above, with glandular teeth; when the flowers open they are lustrous and scabrous above, with short rigid pale hairs, and are pubescent or puberulous below, particularly on the slender midribs and remote slightly raised primary veins; and at maturity they are dark green, lustrous, and slightly roughened on the upper surface, pale yellow-green and scabrous on the lower surface, from an inch and a half to two inches in length and from one half of an inch to an inch in width; they are borne on stout grooved petioles winged above by the decurrent bases of the leaf-blades, villose, ultimately pubescent or puberulous, and from one third to one half of an inch long. The stipules are linear, glandular-serrate, villose, and caducous. On vigorous leading shoots the leaves are often slightly divided into lateral lobes, more coarsely serrate than the leaves of fertile branches, and sometimes three inches long and an inch and a half wide, with stouter and more broadly margined petioles. The flowers, which open from the fifteenth to the twentieth of April, vary from one half to two thirds of an inch in diameter, and are produced in villose few-flowered slender-branched compound narrow corymbs, with linear glandular caducous bracts and bractlets. The calyx-tube is narrowly obconic, glabrous or slightly villose below, and the lobes are linear-lanceolate, usually entire or obscurely glandular-serrate, glabrous on the outer surface, puberulous on the inner surface, and reflexed after the flowers open. There are twenty stamens with small rose-colored anthers, and two or three styles. The fruit ripens late in October or early in November, and is borne on stout glabrous or slightly villose pedicels usually about one half of an inch in length, in few-fruited drooping clusters; it is short-oblong, full and rounded at the ends, slightly pruinose, dull green tinged with red, from one quarter to one third of an inch in length, and surmounted by the now prominent calyx-tube with a broad cavity and elongated spreading lobes which are puberulous on the inner surface and often deciduous before the ripening of the fruit; the flesh is very thin, green, dry, and hard. The two or three nutlets are thick, prominently ridged on the back, with broad low rounded ridges, light brown, and a quarter of an inch long.

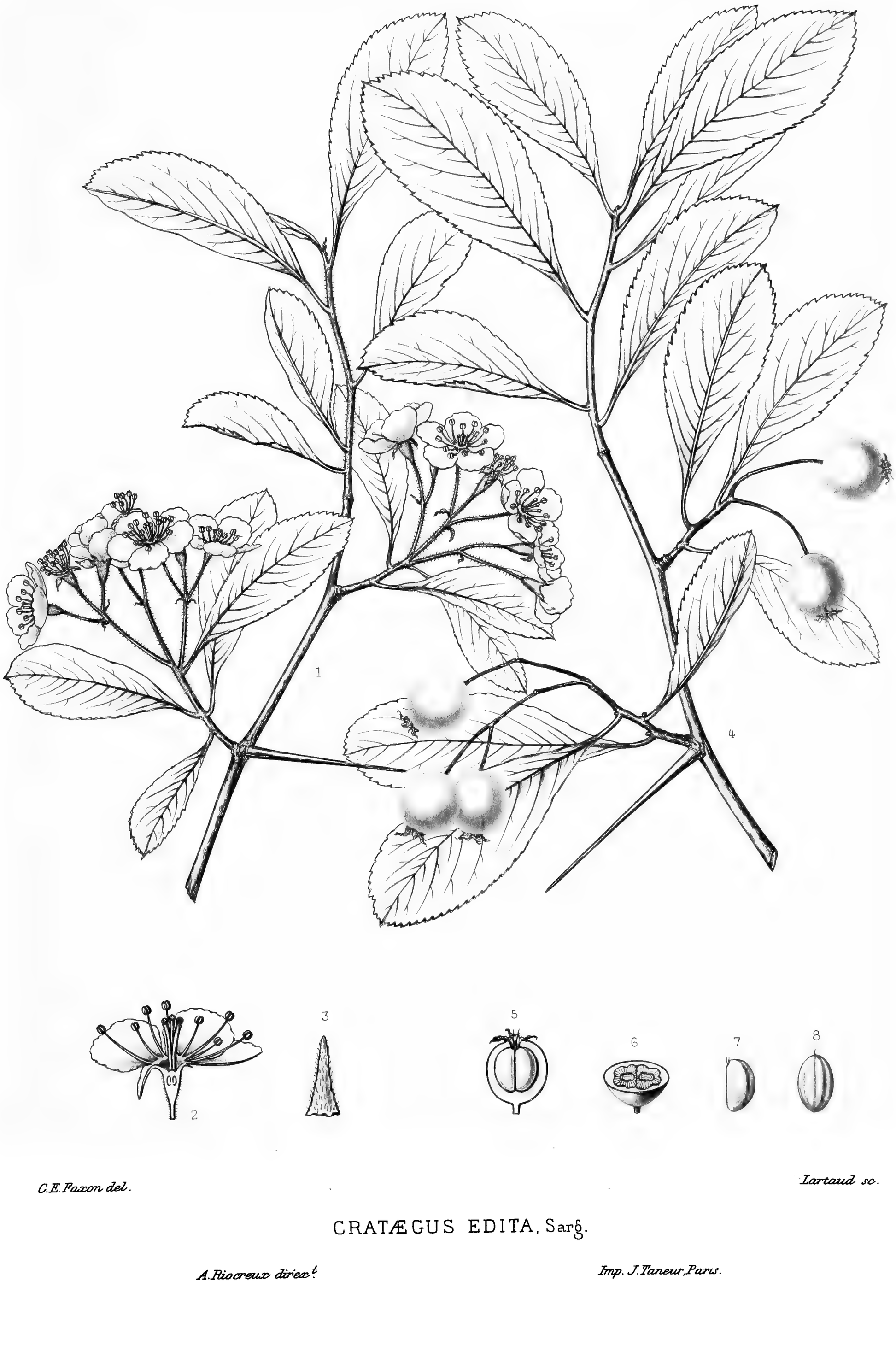
Cratægus edita, which is one of the tallest and most beautiful of the Thorn-trees of the southern states, inhabits low wet woods and the borders of streams, where it grows to its largest size, and the Oak and Pine forests which cover dry hills, and is distributed from the valley of the Sabine River in Texas to western Louisiana.[1] It was first distinguished in April, 1901, by W. M. Canby, B. F. Bush, and C. S. Sargent, near Marshall, Texas.

[1] Near Shreveport, Louisiana, Canby, Bush, and Sargent, April 21, 1901. A specimen of Cratægus, with very young buds only, collected by me at Opelousas, Louisiana, March 29, 1900, is probably of this species.

EXPLANATION OF THE PLATE.

PLATE DCXLVI. CRATÆGUS EDITA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, natural size.
6. Cross section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.



C.E. Faxon del.

Lartaud sc.

CRATÆGUS EDITA, Sarg.

A. Riocreux direx.t

Imp. J. Taneur, Paris.

CRATÆGUS MOHRI.

Haw.

STAMENS 20; anthers light yellow. Leaves usually obovate, acute, dark green, and lustrous.

Cratægus Mohri, Beadle, *Bot. Gazette*, xxviii. 416 (1899). — Mohr, *Contrib. U. S. Nat. Herb.* vi. 548 (*Plant Life of Alabama*). — Gattinger, *Fl. Tennessee*, 98.

A tree, from twenty to thirty feet in height, with a tall straight stem six or eight inches in diameter covered with thin ashy gray or light red-brown bark and sometimes armed with long simple or branched spines, and spreading, slightly pendulous branches forming a broad rather open symmetrical head. The branchlets are slender, straight or slightly zigzag, marked by occasional dark oblong lenticels and armed with thin nearly straight bright chestnut-brown shining spines from an inch to an inch and a half in length; when they first appear they are dark green and glabrous or slightly villose,[1] and during their first season they are bright chestnut-brown and lustrous, and dark brown or gray in their second year. The leaves are obovate or rhomboidal, acute or acuminate at the apex, gradually narrowed and cuneate at the entire base, and coarsely and occasionally doubly serrate above, with straight or usually incurved eglandular teeth; when they unfold they are glabrous and slightly villose along the midribs and the lower side of the principal veins, and at maturity they are thin and firm or subcoriaceous, dark green and very lustrous above, pale below, from an inch to an inch and a half long and from two thirds of an inch to an inch wide, with usually four pairs of thin primary veins and stout midribs which in the autumn are bright red and sometimes puberulous on the under side; they are borne on short stout grooved petioles more or less winged toward the apex and frequently red at maturity. The stipules are linear, finely glandular-serrate, and often half an inch long. On vigorous leading shoots the leaves are sometimes three inches long and two inches wide, and mostly broadly oval and rounded at the apex, or ovate and acute; more coarsely and more generally doubly serrate than the leaves of lateral branchlets, they are frequently divided toward the apex into short broad acute lobes, and their petioles are broadly winged and occasionally glandular, with minute dark glands. The flowers, which open in the beginning of May when the leaves are nearly fully grown and are cup-shaped and about three quarters of an inch in diameter, are produced on slender elongated pedicels, in loose thin-branched many-flowered compound glabrous or villose lax corymbs, with linear-acute caducous bracts and bractlets. The calyx-tube is narrowly obconic, glabrous or occasionally pilose below, and the lobes are linear-lanceolate, entire or finely glandular-serrate, and reflexed after the flowers open. There are twenty stamens with small light yellow anthers, and from three to five styles surrounded at the base by a narrow ring of pale hairs. The fruit ripens about the middle of October and hangs gracefully on the elongated thin bright red pedicels, in many-fruited drooping clusters; it is subglobose or short-oblong, somewhat flattened at the apex, full and rounded at the base, bright orange-red,[2] and about a third of an inch

[1] At Birmingham, where this species is very abundant on the low wet flats west of the city and on the dry hills which surround it, it is quite glabrous with the exception of a few caducous hairs on the upper side of the midribs of very young leaves. The specimens, however, collected at Rome, Georgia, and distributed from the Biltmore Herbarium are more or less villose while young along the midribs and veins, and the corymbs are pubescent or villose. These hairs seem to disappear early in the season, but on a specimen which I collected on the limestone hills of West Nashville, Tennessee, on October 12, 1899, the under side of the midribs was still puberulous.

[2] Mr. Beadle describes the fruit of *Cratægus Mohri* as "dark red or greenish red, or frequently covered with black spots and

in diameter; the calyx is prominent, with a short tube, a deep broad cavity, and usually erect lobes which often fall before the fruit ripens; the flesh is thin, yellow, dry, and mealy. The nutlets, which are generally three in number, are prominently ridged and grooved on the back and about a quarter of an inch long.

Cratægus Mohri is distributed from western Georgia to central Alabama and Mississippi,[1] and northward to middle Tennessee. Attaining its largest size in the low flat woods of central Alabama, where it is often very abundant, it also ascends into the poorer and drier soil of hillsides and low mountain slopes. This handsome tree will help to keep green the name of Charles Mohr, the student of the flora of Alabama.

blotches," but at Birmingham, Alabama, where I first saw this tree on October 5, 1898, the fruit is bright orange-red.

[1] A specimen of *Cratægus Mohri* was collected at Columbus, Mississippi, by Dr. Charles Mohr in November, 1893. He had previously collected it in the Lookout Mountain region of northeastern Alabama, but probably the earliest collector of *Cratægus Mohri* was Dr. A. W. Chapman, as there is in his herbarium preserved at Biltmore a specimen of this species labeled *Cratægus Crus-galli* collected at Rome, Georgia, without date or name of collector, but no doubt gathered by Chapman himself previous to 1890 during one of his visits to Rome.

EXPLANATION OF THE PLATE.

PLATE DCXLVII. CRATÆGUS MOHRI.

1. A flowering branch, natural size.
2. A flower before the expansion of the petals, natural size.
3. Vertical section of a flower with the petals removed, natural size.
4. A fruiting branch, natural size.
5. Cross section of a fruit showing the nutlets, natural size.
6. Vertical section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, front view, enlarged.

C.E.Faxon del. *Himely sc.*

CRATÆGUS MOHRI, Sarg.

A.Riocreux direx.b *Imp.J.Taneur, Paris.*

CRATÆGUS PRUINOSA.

Scarlet Haw.

STAMENS 20; anthers bright rose color. Leaves elliptical to ovate, acute, subcoriaceous, dark blue-green.

Cratægus pruinosa, K. Koch, *Verhandl. Preuss. Gart. Verein.* 246 (*Cratægus und Mespilus*) (1854). — Koehne, *Deutsche Dendr.* 232. — Lange, *Rev. Spec. Gen. Cratægi*, 40, f. G.

Mespilus pruinosa, Wendland, *Flora*, 1823, pt. ii. 701.

Phænopyrum pruinosum, Roemer, *Fam. Nat. Syn.* iii. 154 (1847).

? Cratægus chlorocarpa, K. Koch, *Ind. Sem. Hort. Berol.* 1855, 17.

Mespilus viridis, K. Koch, *Dendr.* i. 148 (not Sweet) (1869).

Cratægus viridis, Lauche, *Deutsche Dendr.* ed. 2, 573 (not Linnæus) (1883).

Cratægus coccinea pruinosa, Dippel, *Handb. Laubholzk.* iii. 436 (1893).

A nearly glabrous tree, from fifteen to twenty feet in height, with a stem a few inches in diameter covered with thin bark separating into large loose pale gray scales, and spreading horizontal branches forming a broad open irregular head; or often shrubby with several intricately branched stems. The branchlets are slender, nearly straight, marked by oblong pale lenticels, and armed with numerous stout nearly straight light chestnut-brown spines from an inch to an inch and a half in length; when they first appear the branchlets are dark green more or less tinged with red, and gradually growing darker they are bright red and lustrous during their first winter, pale gray-brown in their second year, and ultimately ashy gray. The leaves are elliptical, acute, gradually or abruptly narrowed and cuneate at the entire base, irregularly and often doubly serrate above, with glandular straight or incurved teeth, and divided into three or four pairs of short acute or acuminate lateral lobes; when they unfold they are bright red and glabrous with the exception of a few short caducous hairs on the upper side of the base of the midribs; and nearly fully grown when the flowers open from the middle to the end of May, they are then membranaceous and bluish green; in the autumn the leaves are subcoriaceous, dark blue-green and often glaucous on the upper surface, pale on the lower surface, from an inch to an inch and a half long and from three quarters of an inch to an inch wide, with midribs only slightly impressed on the upper side and three or four pairs of thin primary veins running to the points of the lobes; they are borne on very slender glandular petioles slightly winged at the apex by the decurrent bases of the leaf-blades and from an inch to an inch and a quarter in length, and in early spring and in the autumn often bright red. The stipules are linear, straight or falcate, deeply divided into slender teeth tipped with large dark glands, and often nearly half an inch long. On leading shoots the leaves are broadly ovate, often rounded at the base, more coarsely dentate and more deeply lobed than the leaves of lateral branchlets, and frequently two inches and a half long and wide, with stouter and more broadly winged petioles. Late in the autumn the leaves turn dull orange-red. The flowers are produced on long pedicels, in few-flowered thin-branched compound corymbs, with linear showy red glandular bracts and bractlets. The calyx-tube is broadly obconic and the lobes are gradually narrowed from wide bases, long-pointed, and finely glandular-serrate only below the middle. There are twenty stamens[1] with large light rose-colored anthers, and five styles surrounded at the base by a thick ring of hoary tomentum. The fruit, which is borne in few-fruited drooping clusters on long thin light green but ultimately bright red pedicels, is five-angled, apple-green, and covered with a glaucous bloom until

[1] Lange (*Rev. Spec. Gen. Cratægi*) describes the number of stamens as ten to fifteen, but fruiting specimens from the Arboretum at Charlottesburg, connected with the Agricultural College at Copenhagen, sent to the herbarium of the Arnold Arboretum by Lange's son, have twenty stamens.

it is nearly fully ripe; and at maturity late in October it is subglobose but rather broader than it is long, barely angled, with a deep depression at the insertion of the stalk, from one half to five eighths of an inch in diameter, dark purple-red marked by numerous small pale dots, and very lustrous after the bloom has worn off; the calyx is prominent, with a long well-developed tube, a broad deep cavity, and enlarged usually erect lobes which often disappear before the fruit ripens; the flesh is thick, light yellow, sweet, dry, and mealy. The five nutlets are light-colored, deeply grooved on the back, and a quarter of an inch long.[1]

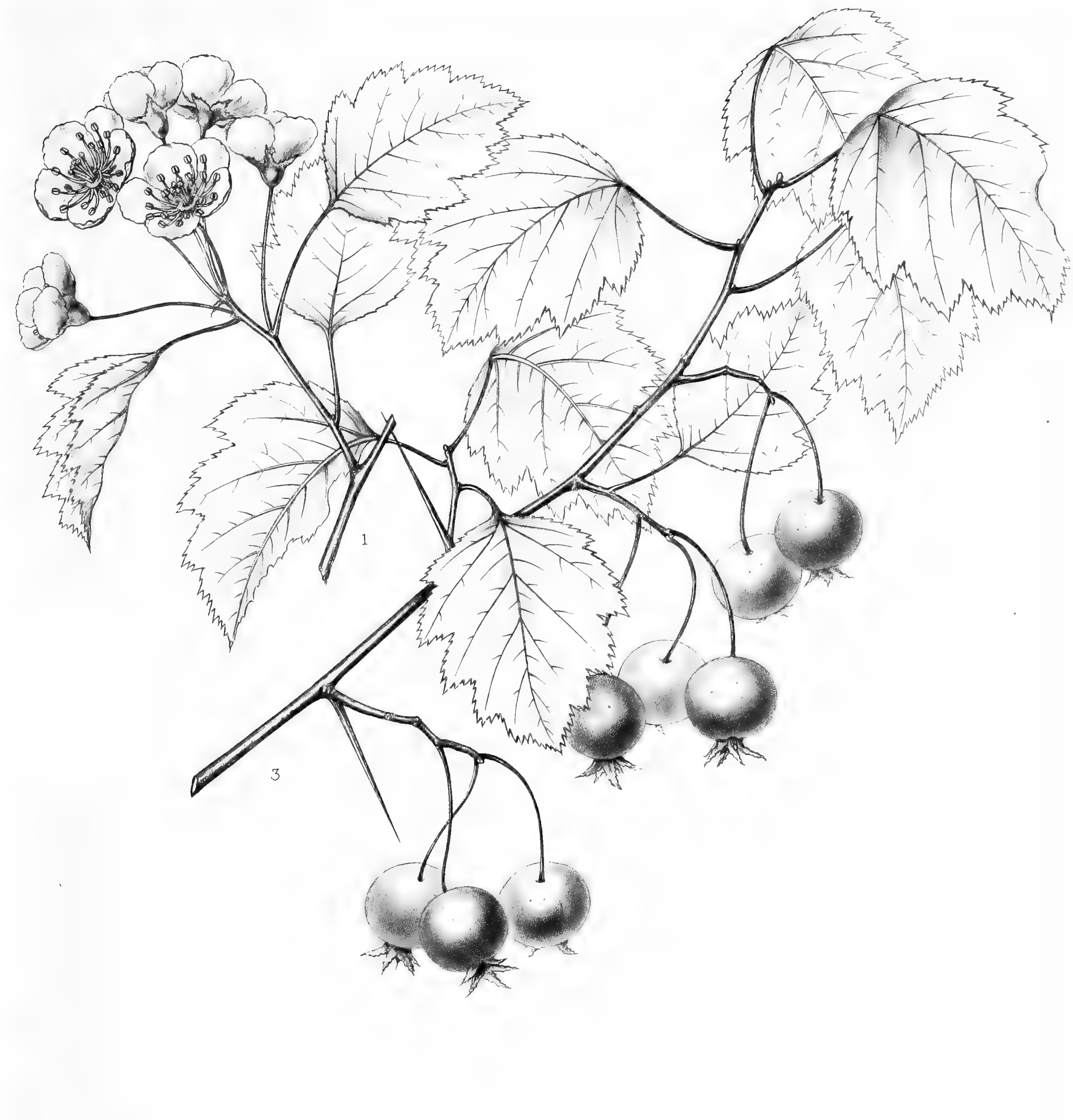
Cratægus pruinosa grows on the slopes of low hills often in limestone soil, and is distributed from southwestern Vermont southward to the foothill region of the southern Appalachian Mountains, where it sometimes ascends to elevations of twenty-five hundred feet above the sea-level, and westward to central Illinois and central Missouri. First described nearly eighty years ago from plants cultivated in Europe, this beautiful and distinct species, which is now known to be one of the commonest and most widely distributed Thorn-trees of the eastern states, has until recently been confounded with *Cratægus coccinea* by American botanists.

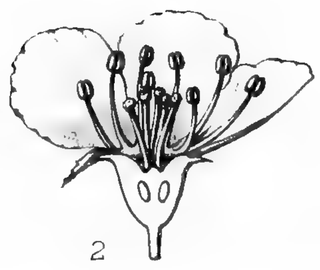
[1] The plate of this species is made from specimens of a tree which has been growing for more than twenty years in the Arnold Arboretum, where it was raised from seeds given to me by Dr. Asa Gray without indication of their origin.

EXPLANATION OF THE PLATE.

PLATE DCXLVIII. CRATÆGUS PRUINOSA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A fruiting branch, natural size.
4. Vertical section of a fruit, natural size.
5. Cross section of a fruit showing the nutlets, natural size.





C.E.Faxon del. *Lartaud sc.*

CRATÆGUS PRUINOSA, C.Kock.

A.Riocreux direx.t *Imp. J.Taneur, Paris.*

CRATÆGUS GEORGIANA.

Haw.

STAMENS 20; anthers rose color. Leaves ovate, acute or acuminate, membranaceous, dark blue-green.

Cratægus Georgiana, Sargent, *Bot. Gazette*, xxxiii. 113 (1902).

A nearly glabrous tree, sometimes twenty-five or thirty feet in height, with a tall trunk ten or twelve inches in diameter covered with dark red-brown scaly bark, and stout wide-spreading branches forming a broad symmetrical round-topped head. The branchlets are slender, straight or somewhat zigzag, marked by occasional small pale lenticels, and armed with straight or slightly curved thin bright chestnut-brown lustrous spines rarely more than an inch and a half in length; when they first appear they are dark green tinged with red, becoming dull reddish brown during their first season and gray or light reddish brown during their second year. The leaves are ovate, acute or acuminate at the apex, full and rounded or broadly cuneate at the base, finely and often doubly serrate, with straight or incurved gland-tipped teeth, and divided into numerous short acute lateral lobes; glabrous with the exception of a few pale caducous hairs on the upper surface and bronze-yellow when they unfold, they are nearly half grown when the flowers open about the twentieth of April, and are then thin, dark yellow-green above and pale below, and at maturity they are thin but firm in texture, dark blue-green on the upper surface, pale on the lower surface, from an inch and a half to two inches long and from an inch to an inch and a quarter wide, with slender yellow midribs and three or four pairs of thin primary veins only slightly impressed above; they are borne on slender grooved petioles often short-winged at the apex by the abruptly decurrent bases of the leaf-blades and usually about three quarters of an inch in length. The stipules are linear-lanceolate, finely glandular-serrate, more or less deeply tinged with red, from one half to three quarters of an inch in length, and caducous. On leading shoots the leaves are often three inches long and two inches wide, or are sometimes deltoid, and usually much more deeply lobed than the leaves of lateral branchlets. The flowers are three quarters of an inch in diameter, and are produced on slender pedicels, in usually five to seven-flowered compact thin-branched compound corymbs, with linear glandular bracts and bractlets which turn bright red in fading. The calyx-tube is broadly obconic and the lobes are gradually narrowed from broad bases, acuminate, and entire or obscurely and irregularly serrate. There are twenty stamens with small light rose-colored anthers, and five styles surrounded at the base by a narrow ring of pale tomentum. The fruit, which ripens and falls early in October, is borne on slender pedicels, in drooping few-fruited clusters; it is oblong, full and rounded at the ends, often obscurely five-angled, dull russet-green, and from three eighths to one half of an inch in length, with very thin light green dry hard flesh and only slightly enlarged calyx-lobes which mostly disappear before the fruit falls, leaving a well-defined ring at the summit of the short calyx-tube. The five nutlets are thin, rounded and irregularly grooved on the back, and about a quarter of an inch long.

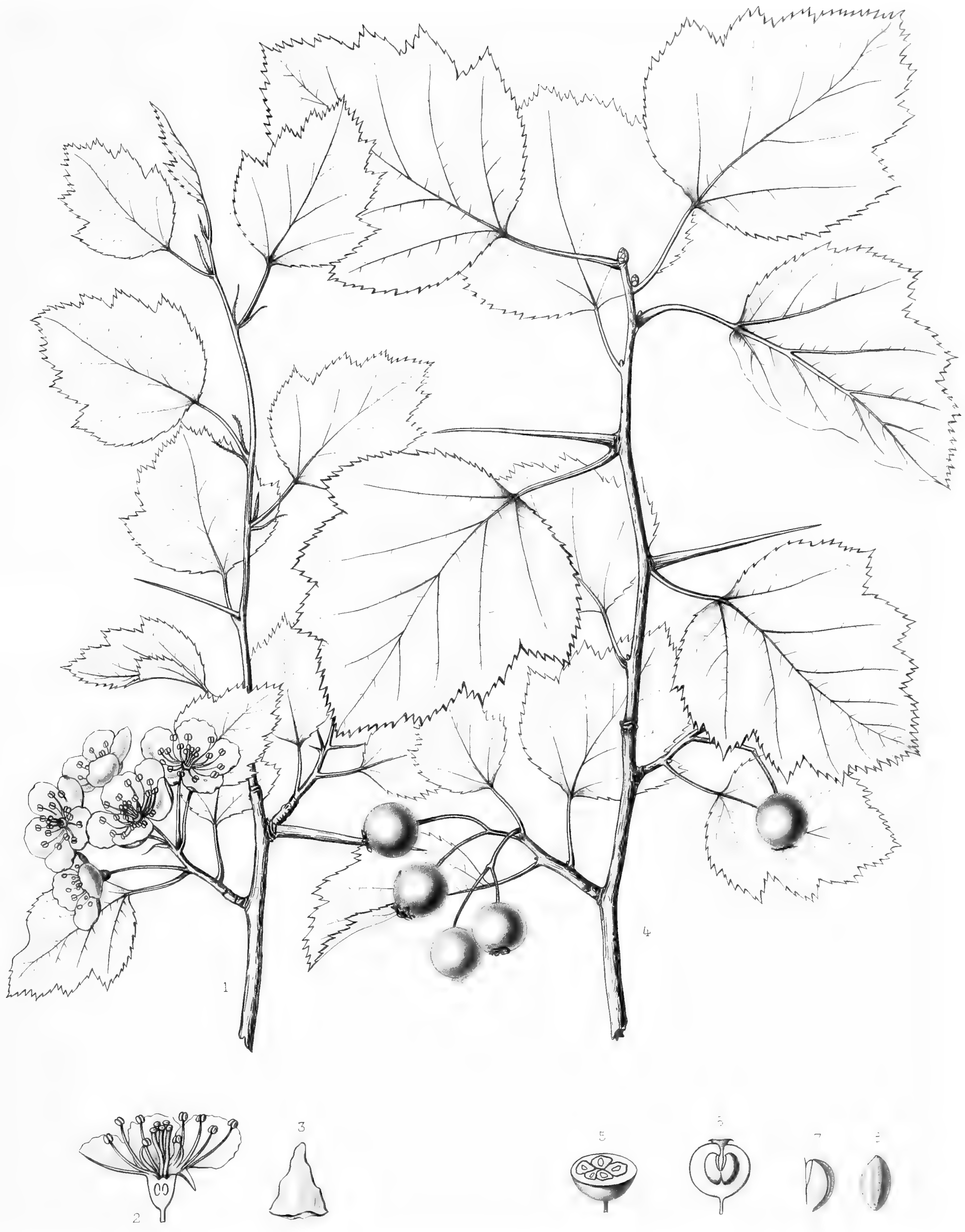
Cratægus Georgiana inhabits low rich river-bottoms and meadows in the neighborhood of Rome, Georgia.[1]

[1] In company with Mr. William M. Canby I first noticed a large specimen of this tree growing near the road leading from Rome to the cliffs of the Coosa River on the 6th of May, 1899, and the following year I gathered the flowers and fruit from this tree from which the plate of this species has been made.

EXPLANATION OF THE PLATE.

PLATE DCXLIX. CRATÆGUS GEORGIANA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Cross section of a fruit, natural size.
6. Vertical section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.



C.E.Faxon del. *Lövendal sc.*

CRATÆGUS GEORGIANA, Sarg.

A.Riocreux direx.t *Imp. J.Taneur, Paris.*

CRATÆGUS BOYNTONI.

Haw.

STAMENS 10; anthers pale yellow. Leaves ovate or oval, subcoriaceous, yellow-green.

Cratægus Boyntoni, Beadle, *Bot. Gazette*, xxviii. 409 (1899). — Mohr, *Contrib. U. S. Nat. Herb.* vi. 547 (*Plant Life of Alabama*). — Gattinger, *Fl. Tennessee*, 98.

Cratægus rotundifolia, Britton & Brown, *Ill. Fl.* ii. 243 (in part) (not Moench) (1897). — Beadle, *Bot. Gazette*, xxv. 446.

A nearly glabrous tree, occasionally twenty feet in height, with a tall straight trunk six or eight inches in diameter and sometimes armed with long gray branched spines, and stout ascending branches forming a narrow open irregular or occasionally round-topped head; or more often a shrub with numerous stems. The bark of the trunk is thick, slightly fissured, and broken into small plate-like scales which are gray often tinged with brown, or dark brown when the tree has grown in the shade of the forest. The branchlets are slender, straight or sometimes slightly zigzag, glabrous, marked by oblong dark lenticels, and armed with numerous thin nearly straight light chestnut-brown spines from an inch and a half to two inches in length; when they first appear they are light orange-brown, soon becoming dark red-brown and lustrous, and in their second season, losing their lustre, they are dark gray-brown, and ultimately ashy gray. The leaves are broadly ovate or oval, acute at the apex, full and rounded or cuneate at the entire glandular base, sharply and often doubly serrate above, with glandular teeth, and frequently divided into two or three pairs of short broad acute lateral lobes; as they unfold they are slightly glandular, viscid, and deep bronze-red in color, and when the flowers open early in May they are nearly fully grown and are membranaceous and glabrous or occasionally slightly pilose, becoming at maturity thick and firm in texture, glabrous, yellow-green on the upper surface, pale on the lower surface, from one to two inches and a half long and from one to two inches wide, with thin pale yellow midribs and from four to seven pairs of slender veins;[1] they are borne on stout petioles which are glandular, with bright red glands, slightly winged above by the decurrent bases of the leaf-blades, and usually about half an inch long. The stipules are linear, finely glandular-serrate, and caducous. On vigorous leading shoots the leaves are often as broad as they are long, truncate or cordate at the base, and more coarsely dentate and more deeply lobed than the leaves of lateral branchlets; and their stipules are foliaceous, lunate, and coarsely glandular-dentate. The flowers, which are about three quarters of an inch in diameter and bad-smelling, are produced on short slender pedicels in compact four to ten-flowered compound corymbs, with large obovate-oblong bracts and bractlets rounded or acute at the apex and deeply divided into slender teeth tipped with large bright red glands. The calyx-tube is broadly obconic and the lobes are abruptly narrowed from broad bases, acute or rounded at the apex, and entire or obscurely and irregularly glandular-serrate above the middle. There are ten stamens with slender filaments and large pale yellow anthers, and from three to five styles surrounded at the base by a broad thick ring of hoary tomentum. The fruit ripens and falls early in October, and is produced in few-fruited erect clusters on short stout pedicels; it is depressed-globose, more or less angled, yellow-green flushed with russet-red, marked by small dark dots, and usually about half an inch in diameter; the calyx is prominent, with a broad deep cavity and large spreading lobes which often disappear before the fruit ripens. The nutlets vary from three

[1] The leaves of seedling plants are pubescent on the lower surface, particularly along the midribs and veins, and puberulous on the upper surface.

to five in number and are prominently ridged on the back, with high rounded ridges, and about a quarter of an inch long.

Cratægus Boyntoni inhabits the banks of streams, the borders of old fields and upland woods in the southern Appalachian foothill region from southern Virginia to northern Georgia and Alabama, southeastern Kentucky and eastern Tennessee, sometimes ascending to elevations of 3000 feet above the level of the sea.

First distinguished by Mr. C. D. Beadle[1] in the neighborhood of Asheville, North Carolina, where this tree is abundant, it was named by him for Mr. F. E. Boynton.[2]

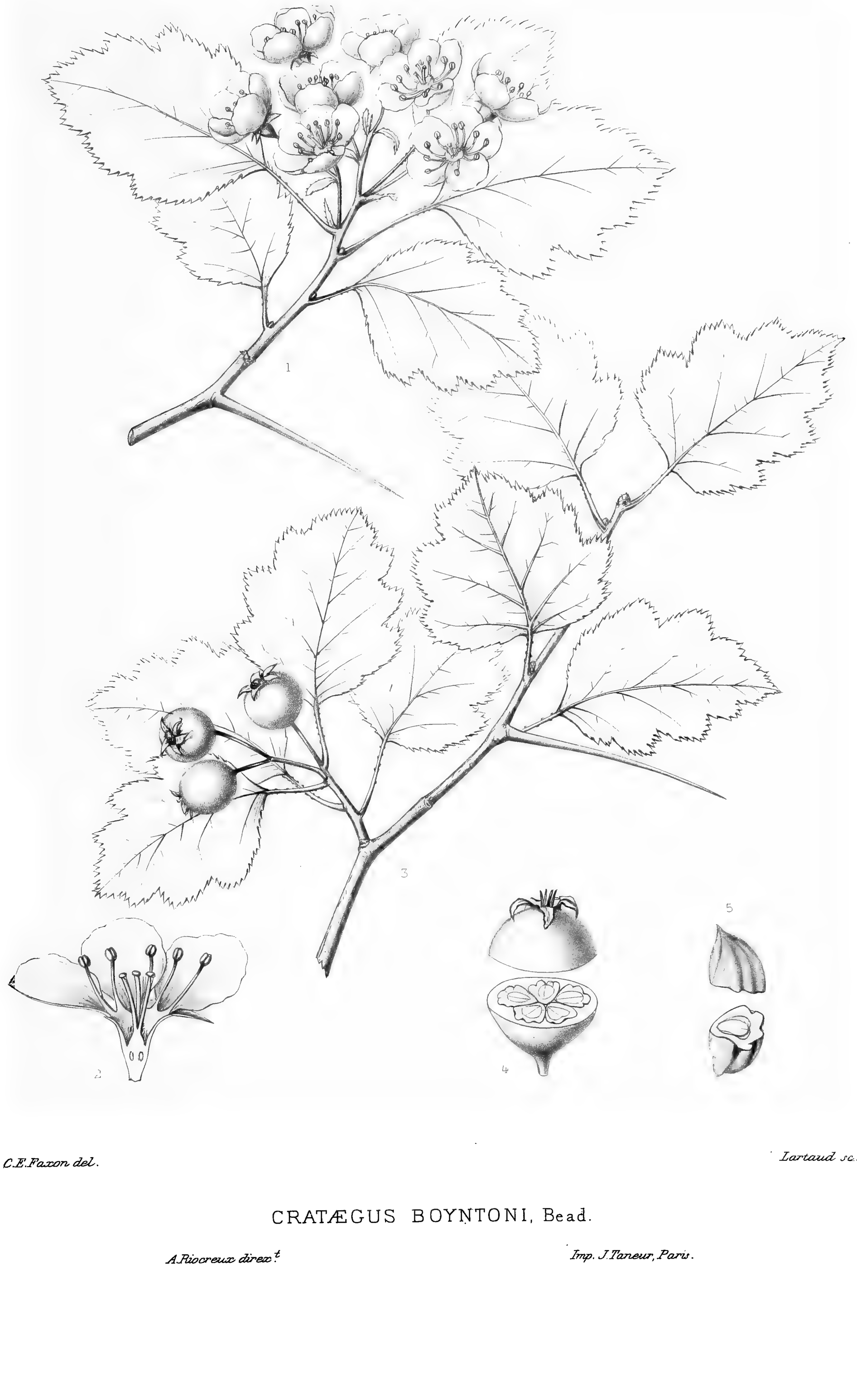
[1] Chauncey Delos Beadle (August 5, 1866) was born in the city of St. Catharines, Ontario, of New England parentage. His father, Delos White Beadle, a son of Dr. Chauncey Beadle, was a lawyer in the city of New York, and later a nurseryman at St. Catharines. His mother, Harriet Converse Steele, was the eldest daughter of Hon. Jason Steele of Windsor, Vermont. C. D. Beadle was educated in the public and private schools of St. Catharines, the Agricultural College of Guelph, Ontario, and at Cornell University. Being obliged in order to support himself to leave Cornell, after a residence of two years at the university, Mr. Beadle found occupation in nurseries in Ohio, Pennsylvania, and New Jersey, devoting his spare time to the study of botany and the formation of an herbarium, and in 1890 having been called to Biltmore, North Carolina, he was placed in charge of the planting operations on the estate of Mr. George W. Vanderbilt. At Biltmore he has established for Mr. Vanderbilt an important herbarium and botanical library and large nurseries, and now, in addition to his duties as head of the botanical and nursery departments of the estate, he is superintendent of the home grounds and gardens. During his residence at Biltmore Mr. Beadle has made the most of excellent opportunities for exploring the flora of the southern states; he has rediscovered either himself or with the aid of his collectors many plants which had not before been seen for many years, and has found a number of entirely undescribed species particularly in the genus Cratægus, to which he has devoted special attention for the past three years. Mr. Beadle has published the results of these studies in *The Botanical Gazette* and in the *Biltmore Botanical Studies, a Journal of Botany*, the first number of which appeared in 1901. Through his efforts many rare southern plants are now common in gardens, and the Biltmore nurseries under his direction are becoming a potent factor in American horticulture.

[2] Frank Ellis Boynton (July 19, 1859) was born in Hyde Park, Vermont. When he was five years old his family moved to Vineland, New Jersey, where he was educated in the public schools and then learned the carpenter's trade, at which he worked in New England until 1881, when he moved to Highlands, North Carolina, in search of a milder climate. Mr. Boynton's early taste for botany now had good opportunity for development, and he began to gather specimens for exchange and plants and seeds for sale, soon becoming a recognized authority on the flora of the southern Appalachian region. In 1893 he left Highlands to assume a position in the Biltmore Herbarium, where he has been active and remarkably successful in increasing the knowledge of the southern Appalachian plants, and where he is still employed.

EXPLANATION OF THE PLATE.

PLATE DCL. CRATÆGUS BOYNTONI.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A fruiting branch, natural size.
4. A fruit divided transversely, enlarged.
5. A nutlet divided transversely, much enlarged.



C.E.Faxon del. *Lartaud sc.*

CRATÆGUS BOYNTONI, Bead.

A.Riocreux direx.t *Imp. J.Taneur, Paris.*

CRATÆGUS VENUSTA.

Haw.

STAMENS 15 to 20; anthers pale yellow. Leaves oval to ovate, acute, coriaceous, dark dull green.

Cratægus venusta, Beadle, *Bot. Gazette*, xxx. 338 (1900).

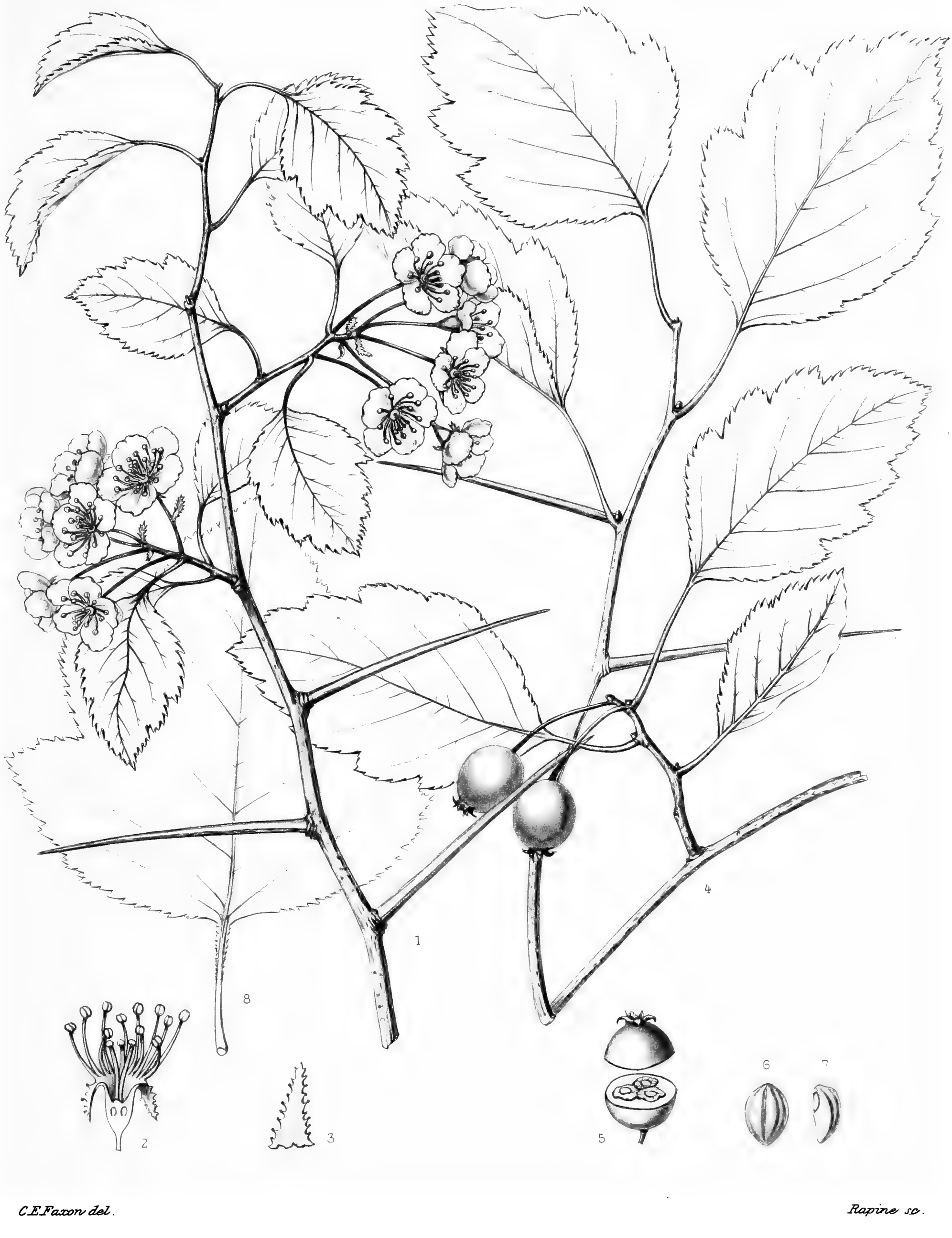
A bushy nearly glabrous tree, often twenty-five feet in height, with a short trunk a foot in diameter and horribly armed, like the large branches, with stout much-branched spines frequently six inches in length. The bark of the trunk is thick and broken into small closely appressed dark red-brown scales which near the base of old trees are frequently nearly black. The branches are thick, dark brown, ascending, and form a wide irregular rather compact head. The branchlets are stout, somewhat zigzag, and armed with numerous straight or slightly curved dark chestnut-brown shining spines which frequently point toward the base of the branch and are from an inch and a half to two inches and a half in length; when they first appear they are dark green more or less tinged with red, light reddish brown or orange-brown during their first season, and often very lustrous during their second summer they become dark dull gray during their third year. The leaves vary in shape from oval to ovate or occasionally to oblong-obovate, and are acute at the apex, gradually or abruptly narrowed and cuneate or rounded at the entire base, finely serrate above, with usually incurved glandular teeth, and frequently slightly and irregularly divided above the middle into from one to three pairs of short broad acute lobes; when they first unfold they are of a dark bronze color, with a few scattered pale caducous hairs on the upper surface, and when the flowers open about the twentieth of April they are yellow-green, smooth, and glabrous; at maturity they are thick and firm in texture, dark dull green above, pale below, and about two inches and a half long and an inch and a half wide, with stout midribs deeply impressed above and from four to seven pairs of thin primary veins; they are borne on stout glandular grooved petioles more or less winged above, from one half to three quarters of an inch in length, and in the autumn often bright red below the middle. The stipules are linear to linear-lanceolate, coarsely glandular-serrate, about half an inch long, and caducous. On vigorous leading shoots the leaves are generally broadly ovate, full and rounded at the base, deeply lobed with broad lobes, and often three and a half inches long and three inches wide. Late in the autumn before falling the leaves, especially those on leading shoots, turn deep orange or scarlet. The flowers, which are an inch in diameter and bad-smelling, are produced in from four to nine-flowered compact compound corymbs, with linear or linear-obovate bracts and bractlets which, like the inner bud-scales, are very coarsely glandular-serrate and turn bright red in fading. The calyx-cup is broadly obconic, and the lobes are gradually narrowed from broad bases, acute, and coarsely glandular-serrate often only below the middle. There are from fifteen to twenty but usually fifteen or seventeen stamens with slender elongated filaments and small pale yellow anthers, and from three to five styles surrounded at the base by a ring of pale hairs. The fruit ripens and falls from the first to the middle of October and is borne on stout pedicels often nearly an inch long, in few-fruited drooping clusters; it is oblong, full and rounded at the ends, dull red often with a bright russet face, and marked by occasional large dark dots; the calyx is prominent, with a long tube and a broad deep cavity, and the lobes, which are not greatly enlarged, are spreading and often deciduous before the fruit ripens; the flesh is thick, yellow, dry, and mealy. The nutlets vary from three to five in number, and are thick, full and rounded on the back, and about a quarter of an inch long.

Cratægus venusta grows in open Oak and Hickory woods on the dry slopes of a low hill known as Red Mountain in the southern part of the city of Birmingham, Alabama, where it was first collected in September, 1899, by Mr. C. L. Boynton of the Biltmore Herbarium, and by me in October of the same year and in the following April.

EXPLANATION OF THE PLATE.

PLATE DCLI. CRATÆGUS VENUSTA.

1. A flowering branch, natural size.
2. Vertical section of a flower, the petals removed, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. A fruit divided transversely, natural size.
6. A nutlet, rear view, enlarged.
7. A nutlet, side view, enlarged.
8. A leaf of a vigorous leading shoot, natural size.



C.E.Faxon del.

Rapine sc.

CRATÆGUS VENUSTA, Bead.

A.Riocreux direx.t

Imp. J.Taneur, Paris.

CRATÆGUS SARGENTI.

Haw.

STAMENS 20; anthers dark purple. Leaves ovate-oblong to elliptical, subcoriaceous, lustrous, yellow-green.

Cratægus Sargenti, Beadle, *Bot. Gazette*, xxviii. 407 (1899). — Mohr, *Contrib. U. S. Nat. Herb.* vi. 547 (*Plant Life of Alabama*). — Gattinger, *Fl. Tennessee*, 98.

An intricately branched nearly glabrous tree, rarely more than twenty feet in height, with a tall trunk six or seven inches in diameter, and stout ascending branches forming a narrow or sometimes a round or flat-topped head; or often a large shrub with few or many stems. The bark of the trunk is thin, gray, or light brown, slightly fissured and broken into numerous thin plate-like scales or nearly smooth and covered with minute closely appressed scales. The branchlets are slender, straight or occasionally somewhat zigzag, often short and frequently forked, marked by numerous small pale lenticels, and armed with thin straight or slightly curved dark chestnut-brown shining spines from three quarters of an inch to an inch and a half in length; glabrous and pale yellow-green when they first appear, they become bright red-brown and lustrous during their first summer, and dull gray-brown in their second season. The leaves vary from oblong-ovate to elliptical or rarely to ovate, and are acute or acuminate at the apex, gradually or abruptly narrowed and cuneate or rounded at the nearly entire base, irregularly doubly serrate above, with glandular straight or incurved teeth, and usually irregularly divided into three or four pairs of short broad acute or acuminate lobes; nearly fully grown when the flowers open late in April, they are then subcoriaceous, pale yellow-green, and villose along the midribs, with scattered pale caducous hairs, and at maturity they are lustrous, dark yellow-green on the upper surface, pale on the lower surface, from two to three inches long and from an inch and a half to two inches broad, with thin midribs only slightly impressed above and from five to seven pairs of thin light yellow veins and conspicuous reticulate veinlets; they are borne on slender grooved glandular petioles more or less broadly winged toward the apex by the decurrent bases of the leaf-blades, and from one half to three quarters of an inch in length. The stipules are linear or linear-lanceolate, glandular, and caducous, and on vigorous leading shoots they are often foliaceous, lunate, and coarsely glandular-dentate. Late in the autumn the leaves assume before falling bright yellow and red tints. The flowers, which are nearly an inch in diameter, are raised on long thin slightly villose pedicels, in from two to five-flowered but usually in three-flowered simple corymbs, with lanceolate coarsely glandular caducous bracts and bractlets. The calyx-tube is narrowly obconic and glabrous or slightly villose, and the lobes are foliaceous, acute, coarsely glandular-serrate above the middle, and reflexed after the flowers open. There are twenty stamens with long slender filaments and large purple anthers, and from three to five but usually four styles surrounded at the base by a narrow ring of pale hairs. The fruit ripens and falls after the middle of September, often only a single fruit maturing from a flower-cluster; it is subglobose or short-oblong, full and rounded at the ends, yellow or orange-yellow, generally more or less flushed with red, marked by occasional large dark dots, and from one third to one half of an inch in length; the calyx is prominent, with an elongated tube and closely appressed lobes; and the flesh is yellow, thin, and firm. The nutlets, although usually four in number, vary from three to five, and are grooved and prominently ridged on the back, and about a quarter of an inch long.

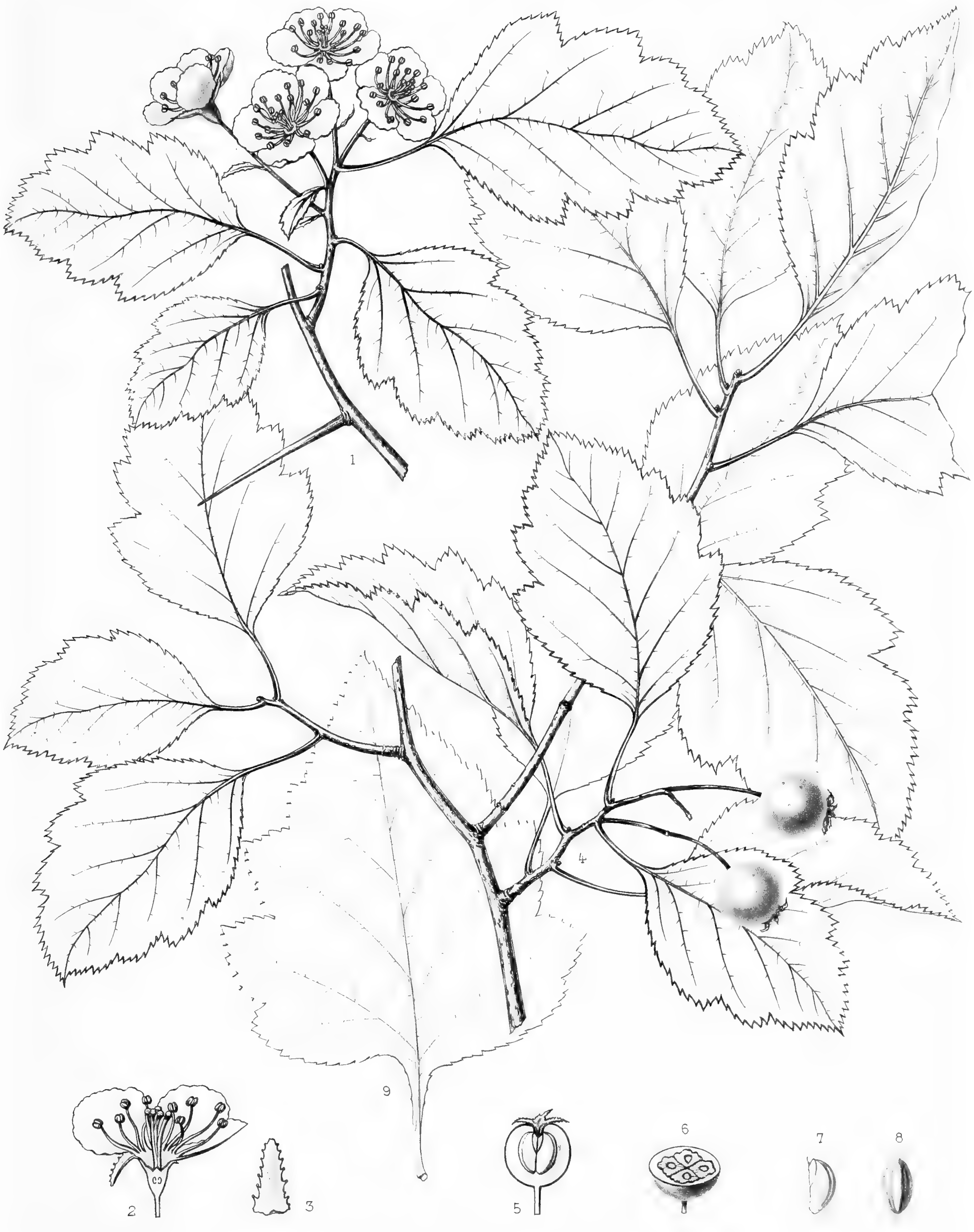
Cratægus Sargenti inhabits rocky woods and bluffs in the foothill region of northwestern

Georgia, southeastern Tennessee, and northeastern Alabama. It is very abundant in Alabama, at Valley Head, which is the most northern station where this species has been observed, and on the low ridges known as Sand Mountain southward to the neighborhood of Birmingham, which is its most southern known station. It was probably first collected by William M. Canby and C. S. Sargent on May 6, 1899, on the high rocky cliffs of the Coosa River a few miles below the city of Rome, Georgia.

EXPLANATION OF THE PLATE.

PLATE DCLII. CRATÆGUS SARGENTI.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, natural size.
6. Cross section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.
9. A leaf of a leading shoot, natural size.



C.E.Faxon del. *Lartaud sc.*

CRATÆGUS SARGENTI, Bead.

A.Riocreux direx.t *Imp.J.Taneur, Paris.*

CRATÆGUS SUBORBICULATA.

Red Haw.

STAMENS 20; anthers rose color. Leaves suborbicular to oval or rarely oblong, short-pointed, thin, dark dull green.

Cratægus suborbiculata, Sargent, *Rhodora*, iii. 72 (1901).

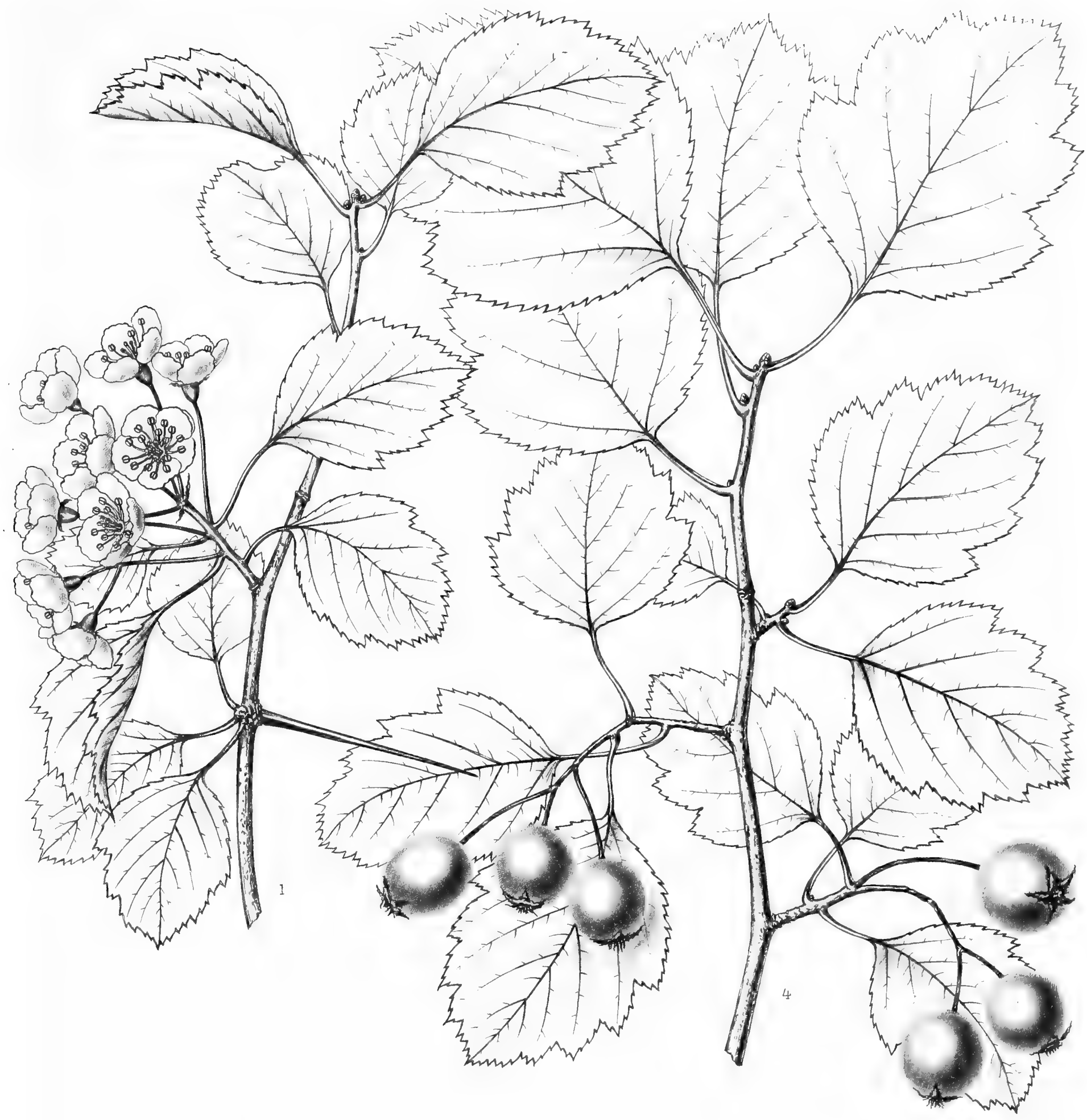
A nearly glabrous tree, rarely more than fifteen or sixteen feet in height, with a well-developed stem five or six inches in diameter covered with pale gray scaly bark, and stout spreading branches forming a broad low flat-topped head. The branchlets are stout, slightly zigzag, marked by oblong pale lenticels, and armed with thick straight or slightly curved bright chestnut-brown shining spines from one to two inches in length; when they first appear they are dark orange or red-brown, soon becoming bright orange-brown and very lustrous, lighter colored during their second year, and ultimately dull ashy gray. The leaves vary from nearly orbicular to oval or rarely to oblong, and are short-pointed at the apex, full and rounded or broadly cuneate at the entire base, sharply and doubly serrate above, with slender straight or incurved glandular teeth, and often divided above the middle into three or four pairs of short acute lobes; when they unfold they are pale yellow-green and somewhat villose on the upper surface toward the base and below in the axils of the principal veins, with a few short caducous hairs, and in the autumn they are thin but firm in texture, dull dark green above, paler below, and usually about an inch and a half long and broad, with slender midribs and four or five pairs of thin primary veins deeply impressed above; they are borne on slender grooved slightly glandular petioles more or less winged above by the decurrent leaf-blades and from five eighths of an inch to an inch in length. The stipules are linear-lanceolate, coarsely glandular-serrate, and from one third to one half of an inch long. On vigorous leading shoots the leaves are nearly orbicular or short-oval, more coarsely serrate and more deeply lobed than the leaves of lateral branchlets, and frequently three inches long and broad, and their petioles are often broadly winged and conspicuously glandular. The flowers open during the first week in June, when the leaves are about a third grown, and are three quarters of an inch in diameter; they are produced on short stout pedicels, in compact six to twelve-flowered glabrous compound corymbs, with linear finely glandular serrate bracts and bractlets. The calyx-tube is broadly obconic, and the lobes are gradually narrowed from broad bases, elongated, acuminate, entire or occasionally obscurely denticulate, and reflexed after the flowers open. There are twenty stamens with slender filaments and small rose-colored anthers turning dark purple in fading, and five styles surrounded at the base by a broad ring of hoary tomentum. The fruit is borne on short rigid pedicels, in few-fruited erect clusters, and falls in October without becoming mellow; it is subglobose but often rather longer than broad, about five eighths of an inch in diameter, and dull red more or less blotched with green, or often wholly green on one face; the calyx is enlarged and prominent, with a broad deep cavity and nearly entire wide-spreading often closely appressed lobes; the flesh is yellow, thin, dry, and hard; the five nutlets are broad and thick, obscurely and unequally grooved on the back, and about a quarter of an inch in length.

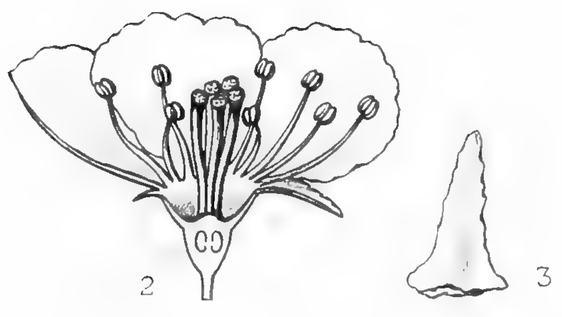
Cratægus suborbiculata grows opposite Lachine on low limestone ridges near the south bank of the St. Lawrence River in the Province of Quebec, where it was discovered at Caughnawaga in August, 1899, by Mr. J. G. Jack.

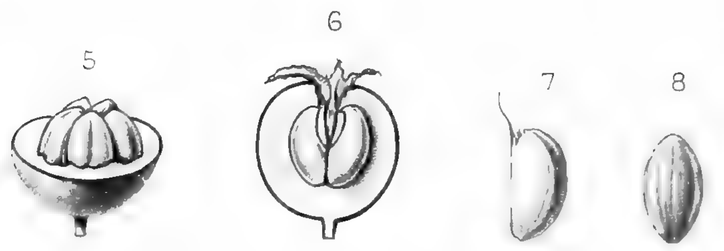
EXPLANATION OF THE PLATE.

PLATE DCLIII. CRATÆGUS SUBORBICULATA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Cross section of a fruit showing the nutlets, natural size.
6. Vertical section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.







C.E Faxon del.

Iartaud sc.

CRATÆGUS SUBORBICULATA. Sarg.

A Riocreux dirext.

Imp. J. Taneur, Paris.

CRATÆGUS COLLINA.

Haw.

STAMENS 20; anthers pale yellow. Leaves obovate to oval, acute, subcoriaceous, dull yellow-green.

Cratægus collina, Chapman, *Fl. S. States*, ed. 2, Suppl. 2, 684 (1892); ed. 3, 140. — Beadle, *Bot. Gazette*, xxv. 357. — Mohr, *Contrib. U. S. Nat. Herb.* vi. 548 (*Plant Life of Alabama*). — Britton, *Man.* 520. — Gattinger, *Fl. Tennessee*, 100.

Cratægus collicola, Ashe, *Jour. Elisha Mitchell Sci. Soc.* xvi. pt. ii. 75 (1900).

A tree, usually from fifteen to twenty but occasionally twenty-five feet in height, with a tall straight stem often buttressed at the base, and frequently armed with many large much-branched spines sometimes six or eight inches long, and stout nearly horizontal wide-spreading branches forming a handsome flat-topped symmetrical head. The bark of the trunk is thin and covered with small closely appressed dark red-brown scales which in falling disclose the bright cinnamon-red inner bark. The branchlets are slender, slightly zigzag, marked by small oblong pale lenticels, and furnished with numerous stout lustrous spines from two to three inches in length; when they first appear they are dark red or green tinged with red, and villose, with long matted silky white hairs; these soon disappear and during the remainder of the season they are rather bright red-brown and puberulous, becoming lighter-colored during their second season, and ultimately ashy gray. The leaves vary from obovate to oval or occasionally to rhomboidal, and are acute at the apex, gradually narrowed or broadly cuneate at the entire base, irregularly and often doubly serrate above, with glandular incurved or straight teeth; when they unfold they are bright red and covered with soft pale hairs which are most abundant along the under side of the midribs and principal veins, and in the autumn they are subcoriaceous, yellow-green on the upper surface, paler on the lower surface, and glabrous with the exception of a few hairs on the under side of the stout yellow midribs and four or five pairs of slender primary veins which are only slightly impressed on the upper side of the leaf; they vary from an inch and a half to two inches in length, and from an inch to an inch and a quarter in width, and are borne on slender villose but soon glabrous petioles more or less winged toward the apex by the decurrent bases of the leaf-blades and from one quarter to one half of an inch in length. The stipules are linear, villose, entire, rarely glandular, and caducous. On vigorous leading shoots the leaves are frequently divided into short broad acute lateral lobes, are much more coarsely dentate than the leaves of lateral branchlets, and are often three inches long and two inches and a half wide, with stout petioles broadly winged above and generally bright red like the lower side of the base of the midribs; and their stipules are often lunate, stipitate, and a quarter of an inch long. The flowers, which appear at the end of April when the leaves are less than a third grown, and earlier than those of the other species of the region, are three quarters of an inch in diameter and are produced on long stout pedicels, in broad compound many-flowered villose corymbs, with lanceolate or linear finely glandular-serrate caducous bracts and bractlets which turn bright red before falling. The calyx-tube is broadly obconic and villose, particularly toward the base, and the lobes are gradually contracted from broad bases, acuminate, usually glabrous on the outer surface, villose on the inner surface, finely glandular-serrate, with dark glands, bright red toward the apex, and reflexed after the flowers open. There are usually twenty stamens with slender filaments and large pale yellow anthers, and five styles. The fruit, which ripens in September and has mostly fallen before the middle of October, is borne in few-fruited erect or drooping puberulous clusters, on stout

elongated pedicels; it is globose but sometimes rather broader than long, dull red marked by small pale dots, and from one third to one half of an inch in diameter; the calyx is enlarged and prominent, with a broad shallow cavity and closely appressed glandular-serrate usually persistent lobes; the flesh is yellow, dry, and mealy. The five nutlets are thick, rounded, ridged, and often grooved on the back, and about a quarter of an inch long.

Although perhaps nowhere very abundant, *Cratægus collina* is a common inhabitant of the foothill region of the southern Appalachian Mountains, where it grows on hillsides in rich soil from southwestern Virginia[1] to central Georgia,[2] and westward to middle Tennessee[3] and central Alabama,[4] ascending in western North Carolina to elevations of twenty-five hundred feet above the sea. Long confounded with *Cratægus Crus-galli* and *Cratægus punctata*, which it resembles in habit, *Cratægus collina* was first distinguished at Rome, Georgia, by Dr. A. W. Chapman.[5]

[1] On June 23, 1892, *Cratægus collina* was collected in the north fork of the Holston River valley, Smythe County, Virginia, by N. L. and E. G. Britton and Anna Murray Vail.

[2] In central Georgia *Cratægus collina* is abundant in Grant Park and on the banks of the Chattahoochee River at Atlanta, and ranges eastward at least as far as Augusta. The most southern point at which I have seen this tree is at Columbus on the Chattahoochee.

[3] In Tennessee *Cratægus collina* ranges at least as far west as Nashville, where it is common on the limestone hills west of the city.

[4] The most southern point in Alabama where I have seen this tree is in the neighborhood of Birmingham.

[5] See vii. 110.

EXPLANATION OF THE PLATE.

PLATE DCLIV. CRATÆGUS COLLINA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A fruiting branch, natural size.
4. A fruit divided transversely, enlarged.
5. A nutlet divided transversely, enlarged.
6. A spine from the trunk of an old tree, natural size.

C.E. Faxon del.

Himely sc.

CRATÆGUS COLLINA, Chapm.

A. Riocreux dirext.

Imp. J. Taneur Paris.

CRATÆGUS SORDIDA.

Haw.

STAMENS 20; anthers rose color. Leaves rhombic to obovate, subcoriaceous, dark green and lustrous on the upper surface.

Cratægus sordida, Sargent, *Bot. Gazette,* xxxiii. 114 (1902).

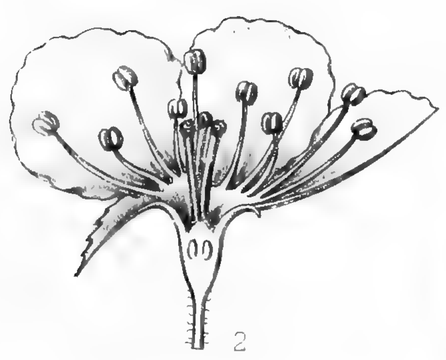
A slender tree, from twenty to twenty-five feet in height, with a tall stem five or six inches in diameter covered with dark furrowed and scaly bark, and often armed with long branched spines, and small ascending branches forming a narrow oval head. The branchlets are very slender, nearly straight or slightly zigzag, marked by large oblong pale lenticels, and armed with numerous thin nearly straight bright chestnut-brown shining spines from one inch to two inches and a half in length, or often unarmed; when they first appear they are dark orange-green and villose, with long scattered pale hairs which sometimes do not entirely disappear until autumn, and in their second season they are bright chestnut-brown and lustrous, becoming dull reddish-brown the following year. The leaves are rhombic, acute, or occasionally obovate and very rarely rounded at the apex, cuneate and entire below, serrate above, with narrow straight or incurved glandular teeth, and rarely irregularly divided above the middle into short acute lobes; about half grown when the flowers open during the first week of May, they are then membranaceous, bright, lustrous, and glabrous with the exception of a few short caducous hairs on the upper surface, particularly along the midribs and principal veins; and at maturity they are subcoriaceous, dark green and lustrous on the upper surface, paler on the lower surface, and generally about an inch and a half long and an inch and a quarter wide; they are borne on stout grooved petioles slightly winged toward the apex by the decurrent leaf-blades, at first villose but soon glabrous, about half an inch long, and in the autumn often bright red. The stipules are linear, acuminate, glandular, with minute bright red glands, and caducous. On vigorous leading shoots the leaves are sometimes oblong-obovate or oval, coarsely dentate, usually divided above the middle into short broad acute lobes, from three to four inches long, from two inches to two inches and a half wide, and decurrent on the stout glandular petioles. The flowers, which vary from an inch to an inch and a quarter in diameter and are very fragrant, are produced on slender pedicels, in few-flowered compact compound slightly villose corymbs, with linear glandular-serrate caducous bracts and bractlets. The calyx-tube is narrowly obconic and the lobes are narrow, acuminate, villose on the inner surface, and reflexed after the flowers open. The petals are dull sordid white, and there are twenty stamens with slender elongated filaments and small rose-colored anthers, and two or three styles surrounded at the base by a narrow ring of pale hairs. The fruit, which ripens about the middle of September and soon falls, is borne on short pedicels, in few-fruited drooping clusters; it is globose, from one third to one half of an inch in diameter, and dark dull red; the calyx is prominent, with a broad shallow cavity, and elongated coarsely serrate appressed or incurved lobes; the flesh is thin, yellow, dry, and mealy. The two or three nutlets are broad, rounded and ridged on the back, with low wide ridges, and a quarter of an inch long.

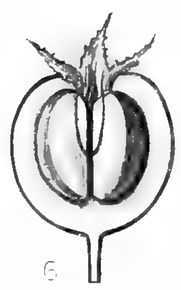
Cratægus sordida inhabits low woods and the gravelly banks of streams in Ripley County, southeastern Missouri, where it was discovered at Pleasant Grove in August, 1899, by Mr. B. F. Bush.

EXPLANATION OF THE PLATE.

PLATE DCLV. CRATÆGUS SORDIDA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Cross section of a fruit, natural size.
6. Vertical section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.





C.E.Faxon del.

Lartaud sc.

CRATÆGUS SORDIDA, Sarg.

A.Riocreux dirext

Imp. J.Taneur, Paris.

CRATÆGUS BRAZORIA.

Haw.

STAMENS 20; anthers dark red. Leaves oval to obovate, acute, thin, dark green, and lustrous.

Cratægus Brazoria, Sargent, *Bot. Gazette*, xxxi. 233 (1901).

A tree, from twenty to twenty-five feet in height, with a tall straight stem eight or ten inches in diameter, and numerous ascending branches forming a handsome symmetrical round-topped head. The bark near the base of large stems is thick, deeply furrowed, and nearly black, and on smaller stems and large branches it is ashy gray, and covered with smooth closely appressed scales. The branchlets are slender, slightly zigzag, marked by small oblong pale lenticels, and unarmed or occasionally armed with long thin gray thorns; covered with matted pale hairs when they first appear, the branchlets soon become glabrous, and during their first season they are light red-brown and lustrous, and ashy gray in their second year. The leaves vary from oval to obovate and are acute or acuminate at the apex, gradually narrowed, cuneate and entire at the base, and coarsely and irregularly glandular-serrate above, with straight spreading teeth; they are coated with hoary tomentum and often bright red as they unfold, and are nearly fully grown when the flowers open from the middle to the end of March, when they are covered with short soft pale hairs which are most abundant on the under side of the thin midribs, and three or four pairs of primary veins; and at maturity they are thin and firm in texture, glabrous, dark green and lustrous on the upper surface, paler on the lower surface, from two inches to two inches and a half long and from an inch and a quarter to an inch and a half wide; they are borne on slender slightly grooved petioles, more or less winged toward the apex, at first tomentose but ultimately glabrous or puberulous, and from one half to three quarters of an inch in length. The stipules are foliaceous, somewhat falcate, acuminate, usually entire, villose, and about a quarter of an inch long. On vigorous leading shoots the leaves are broadly ovate or oblong, full and rounded or broadly cuneate at the base, very coarsely dentate, and often five inches long and two inches and a half wide; and their stipules are foliaceous, lunate, short-pointed, sometimes coarsely glandular-serrate, long-stalked, and frequently half an inch in length. The flowers are three quarters of an inch in diameter, on slender elongated pedicels, in broad thin-branched slightly villose corymbs, with long linear-obovate acuminate glandular villose bracts and bractlets. The calyx-tube is narrowly obconic and coated with long matted pale hairs, and the lobes are narrow, acuminate, obscurely glandular-serrate or nearly entire, villose on both surfaces, and reflexed after the flowers open. There are twenty stamens with slender filaments and small dark red anthers, and five styles surrounded at the base by a thin ring of hoary tomentum. The fruit, which ripens after the first of October, and is borne in spreading or drooping few-fruited clusters, is subglobose or often rather longer than broad, bright canary-yellow, marked by occasional dark dots, and from one third to one half of an inch in length; the calyx is prominent, with a broad deep cavity and lobes which usually disappear before the fruit ripens; the flesh is thin, light yellow, rather dry, but sweet and edible. The five nutlets are rounded and grooved on the back, and nearly a quarter of an inch in length.

Cratægus Brazoria inhabits low rich woods near the banks of the Brazos River in Brazoria, Texas, where I first saw it on March 25, 1900, and where subsequently it has been collected several times by Mr. B. F. Bush.

EXPLANATION OF THE PLATE.

PLATE DCLVI. CRATÆGUS BRAZORIA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, natural size.
6. Cross section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.

C.E. Faxon del. Lartaud sc.

CRATÆGUS BRAZORIA, Sarg.

A. Riocreux direx.t Imp. J. Taneur, Paris.

CRATÆGUS LETTERMANI.

Haw.

STAMENS 10; anthers white. Leaves obovate to broadly oval.

Cratægus Lettermani, Sargent, *Bot. Gazette*, xxxi. 220 (1901).

A tree, eighteen or twenty feet in height, with a trunk six or eight inches in diameter covered with thin dark brown or nearly black bark separating freely into small plate-like scales, and often armed with thin much-branched spines frequently seven or eight inches long, and rather small erect branches forming a wide open head. The branchlets are slender, nearly straight, marked by minute pale lenticels, and armed with stout straight bright red-brown shining spines from an inch and a half to two inches in length; coated when they first appear with hoary tomentum, they are dull red-brown and villose or pubescent during their first season, and dark gray-brown the following year. The leaves are obovate, acute or acuminate or rounded and short-pointed at the apex, gradually narrowed from near the middle and cuneate at the mostly entire base, coarsely and often doubly serrate, with straight or incurved glandular teeth, and frequently slightly and irregularly divided above the middle into three or four pairs of short acute lobes; when they unfold they are strongly plicate and covered with a thick coat of hoary tomentum, and when the flowers open in May they are nearly half grown, roughened above by short pale hairs and pubescent below, and in the autumn they are about two inches long and an inch and a half wide, thick and firm in texture, bright yellow-green and scabrous on the upper surface, and pale and pubescent on the lower surface along the stout midribs, four or five pairs of primary veins, conspicuously forked secondary veins, and reticulate veinlets; they are borne on stout grooved petioles more or less winged above the middle by the decurrent bases of the leaf-blades, at first tomentose, ultimately pubescent or nearly glabrous, and usually about three quarters of an inch in length. The stipules are linear, glandular-serrate, tomentose, about a quarter of an inch long, and caducous. On vigorous leading shoots the leaves are broadly oval, acute or acuminate, more coarsely serrate than the leaves of fertile branches, from two inches and a half to three inches long and from two to two and a half inches wide, with broad lunate coarsely glandular-serrate stipules frequently half an inch in length. The flowers are about three quarters of an inch in diameter, and are produced in compact many-flowered compound thick-branched tomentose corymbs, with linear glandular-serrate caducous bracts and bractlets. The calyx-tube is narrowly obconic and tomentose, and the lobes are narrow, acuminate, finely glandular-serrate, villose, and reflexed after the flowers open. There are ten stamens with small anthers, and five styles surrounded at the base by a broad ring of hoary tomentum. The fruit, which ripens early in October and is borne on stout pubescent pedicels, in few-fruited spreading or drooping clusters, is subglobose or occasionally slightly obovate, full and rounded and puberulous at the ends, dull orange-red, marked by large pale dots, and about half an inch in diameter; the calyx-cavity is broad and shallow, and the lobes, which often fall before the fruit ripens, are enlarged, coarsely glandular-serrate, and reflexed; the flesh is thin, yellow, dry, and mealy. The five nutlets are acute at the ends, very prominently ridged on the back, with high rounded ridges, dark brown, and a quarter of an inch long.

Cratægus Lettermani grows in low rich soil among Oaks and Hickories in situations where it is often inundated during several weeks in winter, near Allenton, Missouri, where it was discovered in 1882 by Mr. George W. Letterman.[1]

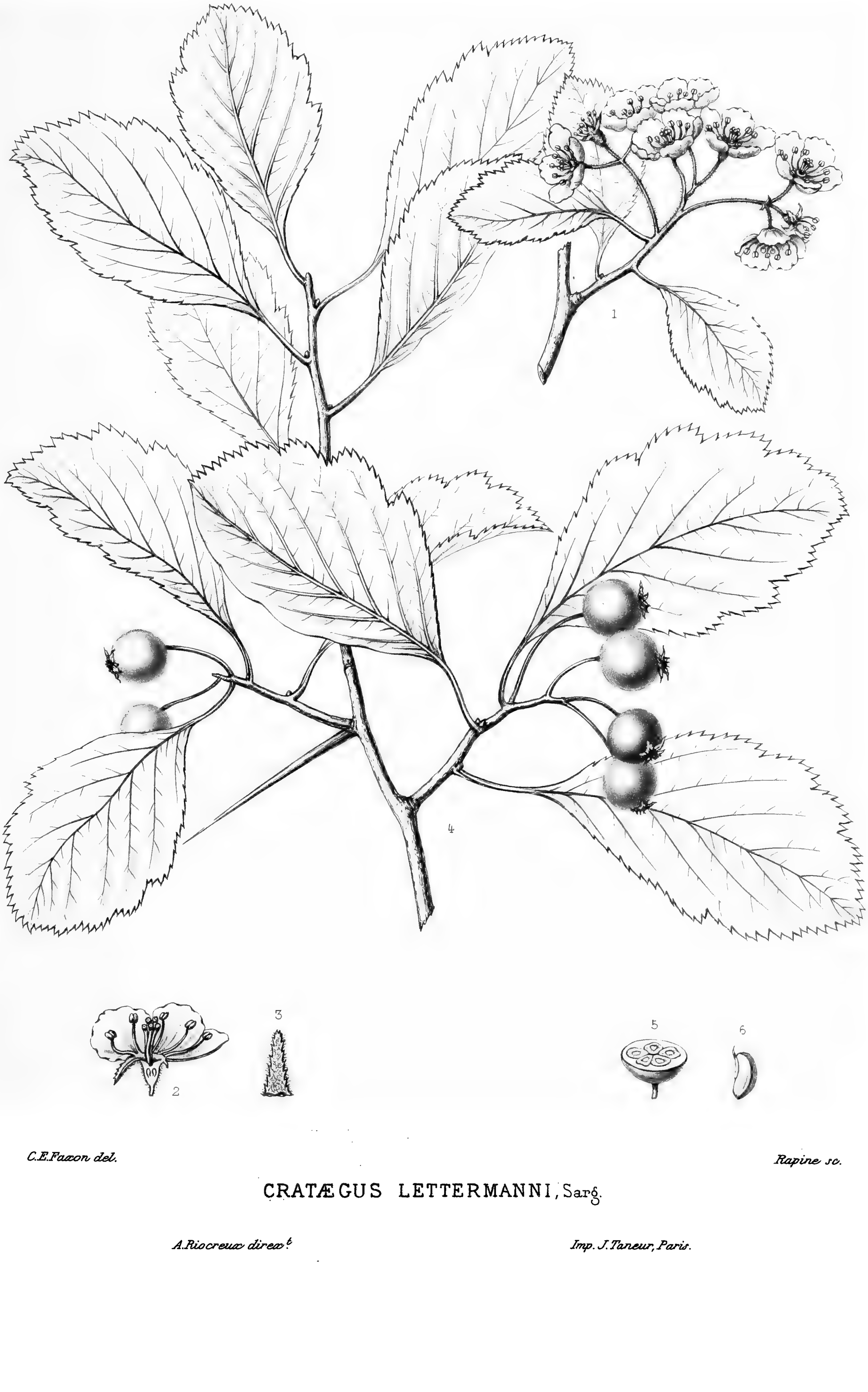
[1] George Washington Letterman (1884), the son of John and Charlotte (Blair) Letterman, was born near Bellefonte, Centre County, Pennsylvania, of a family which had lived for three generations in Pennsylvania, his father being of Dutch and his mother

of Irish descent. From the public schools he entered the State College in Centre County, but left before graduation to join the Union army, in which he enlisted as a private. Serving until the end of the war he was mustered out of the service with the rank of captain of volunteers. After crossing the plains to New Mexico in 1866, he returned to Pennsylvania, and then going west again to Kansas, with the idea of becoming a farmer in that state, he finally in 1869 settled in Allenton, Missouri, a railroad hamlet about thirty miles west of St. Louis. Here Mr. Letterman taught in the public school uninterruptedly for twenty years, and then for two years served as superintendent of schools in St. Louis County. Shortly after settling in Allenton, Mr. Letterman met August Fendler (see xii. 123) the botanist, who had a farm at this time in the neighborhood. This meeting with Fendler stimulated his interest in plants, especially in trees, and led to an acquaintance with Dr. Engelmann, for whom Letterman made large collections of plants in the neighborhood of Allenton, with many notes on the Oaks and Hickories. In 1880 he was appointed a special agent of the Census Department of the United States to collect information about the trees and forests of Missouri, Arkansas, western Louisiana, and eastern Texas, and later he was employed as an agent of the American Museum of Natural History in New York to collect specimens of the trees of the same region for the Jesup Collection of North American Woods. The distribution of the trees of this region before Mr. Letterman's travels was little known, and much useful information concerning them was first gathered by him. Of his numerous discoveries, species of Vernonia, Poa, and Stipa also commemorate the name of Letterman.

EXPLANATION OF THE PLATE.

PLATE DCLVII. CRATÆGUS LETTERMANI.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Cross section of a fruit, natural size.
6. A nutlet, natural size.



C.E.Faxon del. *Rapine sc.*

CRATÆGUS LETTERMANNI, Sarg.

A.Riocreux direx.t *Imp. J.Taneur, Paris.*

CRATÆGUS PRATENSIS.

Red Haw.

STAMENS 10; anthers rose color. Leaves oblong-obovate, subcoriaceous, dark green, and lustrous.

Cratægus pratensis, Sargent, *Bot. Gazette*, xxxi. 6 (1901).

A tree, occasionally twenty feet in height, with a tall stem from three to seven inches in diameter covered with dark brown scaly bark, and often armed with long slender much-branched ashy gray spines, and spreading branches forming a broad round-topped symmetrical head. The branchlets are slender, somewhat zigzag, marked by many small pale lenticels, and furnished with numerous thin straight or slightly curved shining chestnut-brown spines from two inches to two inches and a half in length; light yellow-green and occasionally slightly villose when they first appear, they soon become glabrous, and are light chestnut-brown or orange-brown and lustrous during their first summer, and dark gray-brown during their second year. The leaves are oblong-obovate, acute or rounded at the apex, gradually narrowed below from near the middle and cuneate and entire at the base, sharply and often doubly serrate, usually only above the middle, with straight or incurved teeth tipped early in the season with minute dark red caducous glands, and often more or less deeply divided toward the apex into short broad acute lobes; when they unfold they are bright bronze-yellow or dark red, and covered on both surfaces with short pale hairs; these soon disappear, and when the flowers open at the end of May the leaves are almost smooth, nearly fully grown, and membranaceous; in the autumn they are glabrous, thick and firm in texture, dark green and lustrous on the upper surface, pale on the lower surface, from an inch and a half to two inches long and from an inch to an inch and a half wide, with thin midribs and four or five pairs of primary veins which, extending obliquely toward the apex of the leaf, are deeply impressed on the upper side and raised and prominent on the lower side; they are borne on slender grooved glabrous petioles usually about half an inch long and more or less winged above. The stipules are linear, straight or falcate, and finely glandular-serrate. On vigorous leading shoots the leaves are often oval or broadly ovate, and frequently three inches long and two and a half inches wide, with foliaceous, lunate, stalked, coarsely glandular-dentate stipules often an inch in length. The flowers are one third of an inch in diameter, and are produced on slender elongated pedicels, in broad loose thin-branched many-flowered compound corymbs which are pubescent or puberulous at first but soon become glabrous, and are furnished with small linear glandular-serrate caducous bracts and bractlets. The calyx-tube is narrowly obconic, coated particularly toward the base with long matted pale hairs, and the lobes are narrow, acuminate, coarsely glandular-serrate, glabrous on the outer surface, villose on the inner surface, and reflexed when the flowers open. There are ten stamens with slender elongated filaments and small rose-colored anthers, and two or three styles surrounded at the base by a narrow ring of pale tomentum. The fruit, which ripens early in October but does not fall until November, hangs on the elongated pedicels, in loose drooping many-fruited clusters; it is globose, bright scarlet, slightly pruinose, marked by occasional large pale dots, and about a third of an inch in diameter; the calyx-cavity is deep and narrow, and the lobes are much enlarged, coarsely glandular-serrate, and often deciduous before the fruit becomes entirely ripe; the flesh is thin, yellow, dry, and mealy. The two or three nutlets are thick and broad, rounded and conspicuously ridged on the back, with prominent grooved ridges, and about a quarter of an inch long.

Cratægus pratensis grows in open woods near the banks of small streams in the prairie region of

Stark and Peoria counties, Illinois. It was first distinguished in May, 1895, by Mr. Virginius H. Chase.

EXPLANATION OF THE PLATE.

PLATE DCLVIII. CRATÆGUS PRATENSIS.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. A fruit divided transversely, natural size.
6. A nutlet, front view, enlarged.
7. A nutlet, rear view, enlarged.

C.E. Faxon del.

Rapine sc.

CRATÆGUS PRATENSIS, Sarg.

A. Riocreux direx.t

Imp. J. Taneur, Paris.

CRATÆGUS MOLLIS.

Red Haw.

STAMENS 20; anthers light yellow. Leaves broadly ovate, thick and firm.

Cratægus mollis, Scheele, *Linnæa*, xxi. 569 (1848). — Walpers, *Ann.* ii. 523. — Sargent, *Silva N. Am.* iv. 99 (in part), t. 182, f. 4. — Dippel, *Handb. Laubholzk.* ii. 436. — Koehne, *Deutsche Dendr.* 232 (in part). — Britton, *Man.* 521 (in part). — Gattinger, *Fl. Tennessee*, 97.

Cratægus coccinea ϵ, ? **mollis**, Torrey & Gray, *Fl. N. Am.* i. 465 (in part) (1838). — Watson & Coulter, *Gray's Man.* ed. 6, 165 (in part).

Cratægus subvillosa ? Torrey, *Pacific R. R. Rep.* iv. 86 (1857). — Ridgway, *Proc. U. S. Nat. Mus.* 1882, 66. — Sargent, *Forest Trees N. Am. 10th Census U. S.* ix. 78 (in part).

Cratægus tomentosa, var. **mollis**, Gray, *Man.* ed. 5, 160 (in part) (1867).

A tree, sometimes forty feet in height, with a tall trunk often eighteen inches in diameter, and stout wide-spreading smooth ashy gray branches forming a broad round-topped and often symmetrical head. The bark of the trunk is thin and broken into small closely appressed scales usually dark brown near the base of old trees and light gray on young stems. The branchlets are stout, slightly zigzag, marked by numerous small pale lenticels, and unarmed or armed with occasional straight thick bright chestnut-brown shining spines from one to two inches in length; when they first appear they are covered with a thick coat of long white matted hairs, and during their first summer they are orange-brown or reddish brown and villose, becoming glabrous and lustrous in their second year, and ultimately dark gray-brown. The leaves are broadly ovate, acute, usually cordate or rounded at the broad base, coarsely and generally doubly serrate, with straight glandular teeth, and more or less deeply divided into four or five pairs of acute lateral lobes; when they unfold the upper surface is covered with short pale hairs and the lower surface is thickly clothed with hoary tomentum; and about half grown when the flowers open early in May, they are then membranaceous, light yellow-green, and still hairy above and pubescent or tomentose below; in the autumn they are usually from three to four inches long and broad, thick and firm in texture, dark yellow-green and slightly rugose on the upper surface, and paler and pubescent or puberulous on the lower surface along the stout midribs and four or five pairs of slender primary veins which extend to the points of the lobes; they are borne on stout nearly terete petioles tomentose at first, ultimately pubescent or nearly glabrous, often slightly glandular, with small dark caducous glands, and from an inch to an inch and a quarter in length. The stipules are lanceolate, acuminate, straight or falcate, coarsely serrate, and frequently half an inch in length. On vigorous shoots the leaves are more deeply lobed, with a deeper basal sinus than the leaves of fertile branchlets, and frequently five or six inches long and broad, with foliaceous lunate coarsely serrate stipules sometimes an inch in length. The flowers are an inch in diameter and are borne in broad thick-branched compound many-flowered tomentose corymbs, with conspicuous oblong-obovate acuminate glandular-serrate slightly villose bracts and bractlets which are at first pale green, and turn red or brown in fading. The calyx-tube is narrowly obconic and covered with hoary tomentum, and the lobes are narrow, acuminate, coarsely glandular-serrate, with bright red glands, villose on the outer surface, tomentose on the inner surface, and reflexed after the petals fall. There are twenty stamens with large light yellow anthers, and four or usually five styles surrounded at the base by a broad ring of hoary tomentum. The fruit ripens late in August and in September, and is borne on stout pedicels, in drooping few-fruited villose clusters; it is short-oblong or subglobose, full and rounded at the ends, more or less pubescent, scarlet, marked by occasional large pale dots, from three quarters

of an inch to an inch in diameter, and surmounted by the prominent hairy calyx, with a broad deep cavity and enlarged erect and incurved lobes which mostly fall before the fruit ripens; the flesh is thick, yellow, subacid, dry, and mealy. The four or usually five nutlets are thin, rounded and sometimes obscurely ridged on the back, light brown, and a quarter of an inch long.[1]

Cratægus mollis grows in low rich soil usually on the bottom-lands of streams, and is distributed from northern Ohio[2] to eastern Dakota[3] and Nebraska,[4] eastern Kansas, and central Tennessee.[5]

[1] In the fourth volume of this work several Thorn-trees which are now believed to be distinct species were united with the *Cratægus mollis* of Scheele, originally described from specimens gathered in Illinois. Scheele's description leaves little doubt of the identity of his species with the common large-fruited Thorn of Illinois and the neighboring states, which I now call *Cratægus mollis*, although it does not include an account of the flowers.

A flowering specimen of a tree cultivated in Germany, sent to me by Professor Koehne of Berlin as a representative of *Cratægus tiliæfolia*, Lange (*Rev. Gen. et Spec. Cratægi*, 31), is not distinguishable from specimens of *Cratægus mollis* gathered in Illinois.

[2] E. L. Moseley, Perkins, Essex County, 1895.

[3] D. H. Saunders, *Bull.* 64, *South Dakota Agric. College*, 157 (*Ferns and Flowering Plants of South Dakota*).

[4] Bessey, *Rep. Neb. State Board Agric.* 1899, 87 (*The Forests and Forest Trees of Nebraska*).

[5] A. Gattinger, without date.

EXPLANATION OF THE PLATE.

PLATE DCLIX. CRATÆGUS MOLLIS.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Cross section of a fruit showing the nutlets, natural size.
6. Vertical section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.
9. A leaf of a shoot, somewhat reduced in size.

C.E.Faxon del. *Lartaud sc.*

CRATÆGUS MOLLIS, Scheele.

A.Riocreux direx.t *Imp.J.Taneur, Paris.*

CRATÆGUS ARKANSANA.

Red Haw.

STAMENS 20; anthers pale yellow. Leaves oblong-ovate to oval, acute, coriaceous, dull dark green.

Cratægus Arkansana, Sargent, *Bot. Gazette*, xxxi. 223 (1901).

A tree, twenty feet in height, with a tall straight stem covered with pale scaly bark, and thick slightly ascending and wide-spreading branches forming a broad open irregular head. The branchlets are very stout, somewhat zigzag, marked by many small pale lenticels, and unarmed or armed with occasional straight light chestnut-brown shining spines gradually narrowed from broad bases, and usually from one third to one half of an inch in length; dark green and covered when they first appear with long pale hairs, at midsummer the lateral fertile branchlets are coated with rusty pubescence, and the leading shoots are often glabrous and light orange-brown and lustrous, and during their first winter the branchlets are orange-brown and very lustrous, becoming ashy gray in their second year. The winter-buds are acute, about an eighth of an inch long, nearly as broad as they are long, dark red, and puberulous along the margins of the outer scales. The leaves are oblong-ovate or oval, acute at the apex, broadly cuneate, rounded or truncate at the base, usually divided above the middle into three or four pairs of short broad acute lobes, and serrate, sometimes to the base, with short straight glandular teeth; when the flowers open about the middle of May they are nearly one third grown and are coated with soft white hairs which are most abundant on the under surface of the midribs and veins, and in the autumn they are thick and leathery, dull dark green and glabrous on the upper surface, pale yellow-green on the lower surface, from two to three inches in length and from an inch and three quarters to two inches in width, with stout light yellow midribs and primary veins deeply impressed above and slightly villose below, with scattered pale hairs, and conspicuous secondary veins and reticulate veinlets; they are borne on stout deeply grooved petioles more or less winged toward the apex, glandular, with minute usually deciduous dark glands, at first tomentose but ultimately glabrous or puberulous, generally dark red after midsummer, and from an inch to an inch and a half long. The stipules are glandular-serrate, villose, linear-lanceolate or narrowly obovate, and about half an inch long. On vigorous leading shoots the leaves are usually broadly ovate, rounded or truncate at the base, and often four inches long and three inches wide, with foliaceous, lunate, coarsely glandular-dentate stipules sometimes nearly an inch in length. Late in October or early in November the leaves turn bright clear yellow. The flowers are an inch in diameter, and are produced on short stout pedicels, in broad rather compact many-flowered thin-branched villose compound corymbs, with oblong-obovate and acute or linear-lanceolate finely glandular-serrate often persistent bracts and bractlets. The calyx-tube is narrowly obconic, coated with long matted pale hairs, and the lobes are short, acute, very coarsely glandular-serrate, and glabrous or slightly villose. There are twenty stamens with slender filaments and large pale yellow anthers, and five styles. The fruit, which ripens at the end of October, and then remaining on the branches for several weeks falls gradually, hangs in few-fruited drooping clusters, on stout villose pedicels; it is oblong or rarely obovate, full and rounded and slightly tomentose at the ends, bright crimson, very lustrous, marked by few large dark dots, from three quarters of an inch to an inch long, and about three quarters of an inch thick; the calyx-cavity is deep but comparatively narrow, and the lobes are small, linear-lanceolate, coarsely glandular-serrate, red on the upper side toward the base, erect, and persistent; the flesh is thick, yellow, and subacid. The five nutlets are

small in comparison to the size of the fruit, thin, rounded, or slightly and irregularly ridged on the back, and a third of an inch long.

First distinguished from trees in the Arnold Arboretum raised from seeds collected in 1883 in Newport, Arkansas, by Mr. George W. Letterman, *Cratægus Arkansana* has not been rediscovered. Perfectly hardy in eastern Massachusetts, where it has grown rapidly to a large size, this handsome tree is unsurpassed late in the autumn in the beauty of its large brilliant and abundant fruits, which remain on the branches long after those of the other species of this group have disappeared, and make it one of the most desirable garden plants of the genus.

EXPLANATION OF THE PLATE.

PLATE DCLX. CRATÆGUS ARKANSANA.

1. The end of a flowering branch, natural size.
2. Vertical section of a flower, natural size.
3. A fruiting branch, natural size.
4. Vertical section of a fruit, natural size.
5. Cross section of a fruit showing the nutlets, natural size.
6. A nutlet, side view, enlarged.
7. A nutlet, front view, enlarged.

C.E. Faxon del.

Lartaud sc.

CRATÆGUS ARKANSANA, Sarg.

A. Riocreux direx.t

Imp. J. Taneur, Paris.

CRATÆGUS SERA.

Haw.

STAMENS 20; anthers pale yellow. Leaves oblong-ovate, membranaceous.

Cratægus sera, Sargent, *Bot. Gazette*, xxxiii. 115 (1902).

A tree, from thirty to forty feet in height, with a tall straight trunk twelve or eighteen inches in diameter covered with pale slightly fissured bark, and thick branches forming a broad round-topped symmetrical head. The branchlets are slender, somewhat zigzag, marked by small oblong pale lenticels, and unarmed, or armed with occasional straight slightly curved bright chestnut-brown lustrous spines from an inch and a quarter to an inch and a half in length; coated when they first appear with thick hoary tomentum, they are light red-brown and puberulous during their first summer, and ultimately pale orange-brown. The leaves are oblong-ovate, acute at the apex, rounded, truncate or slightly cordate, particularly on vigorous shoots, at the broad base, irregularly divided into four or five pairs of short acute lateral lobes, and sharply and sometimes doubly serrate nearly to the base, with straight glandular teeth; unfolding about the first of May with the opening of the flowers, they are then covered above with short soft white hairs and coated below with thick hoary tomentum; and at maturity they are membranaceous, dark yellow-green and glabrous on the upper surface, pubescent on the lower surface, from two to four inches long and from two and a half to three inches wide, with slender midribs slightly impressed above and thin remote primary veins extending to the points of the lobes; they are borne on slender tomentose ultimately pubescent petioles which vary from an inch to an inch and a half in length. The stipules are linear, acute, glandular-serrate, villose, a quarter of an inch long, and on vigorous leading shoots often lunate, abruptly acuminate, and half an inch in length. The flowers are three quarters of an inch in diameter, and are borne in compact compound many-flowered tomentose corymbs, with lanceolate or oblanceolate coarsely glandular-serrate villose or tomentose bracts and bractlets. The calyx-tube is broadly obconic and coated with long matted pale hairs, and the lobes are broad, acute or acuminate, glandular-serrate, with large dark glands, tomentose on the outer surface, and villose on the inner surface. There are twenty stamens with pale yellow anthers, and four or usually five styles. The fruit ripens about the first of October and is borne on stout puberulous pedicels, in drooping few-fruited clusters; it is obovate or oblong, dull dark red, marked by small pale dots, usually slightly villose or pubescent at the ends, two thirds of an inch long and half an inch wide; the calyx-cavity is broad and shallow, and the lobes are enlarged, coarsely glandular-serrate, erect and incurved, and often deciduous before the ripening of the fruit; the flesh is thick, yellow, dry, and mealy. The four or usually five nutlets are thin, light brown, irregularly depressed on the back, with broad shallow grooves, and a quarter of an inch in length.

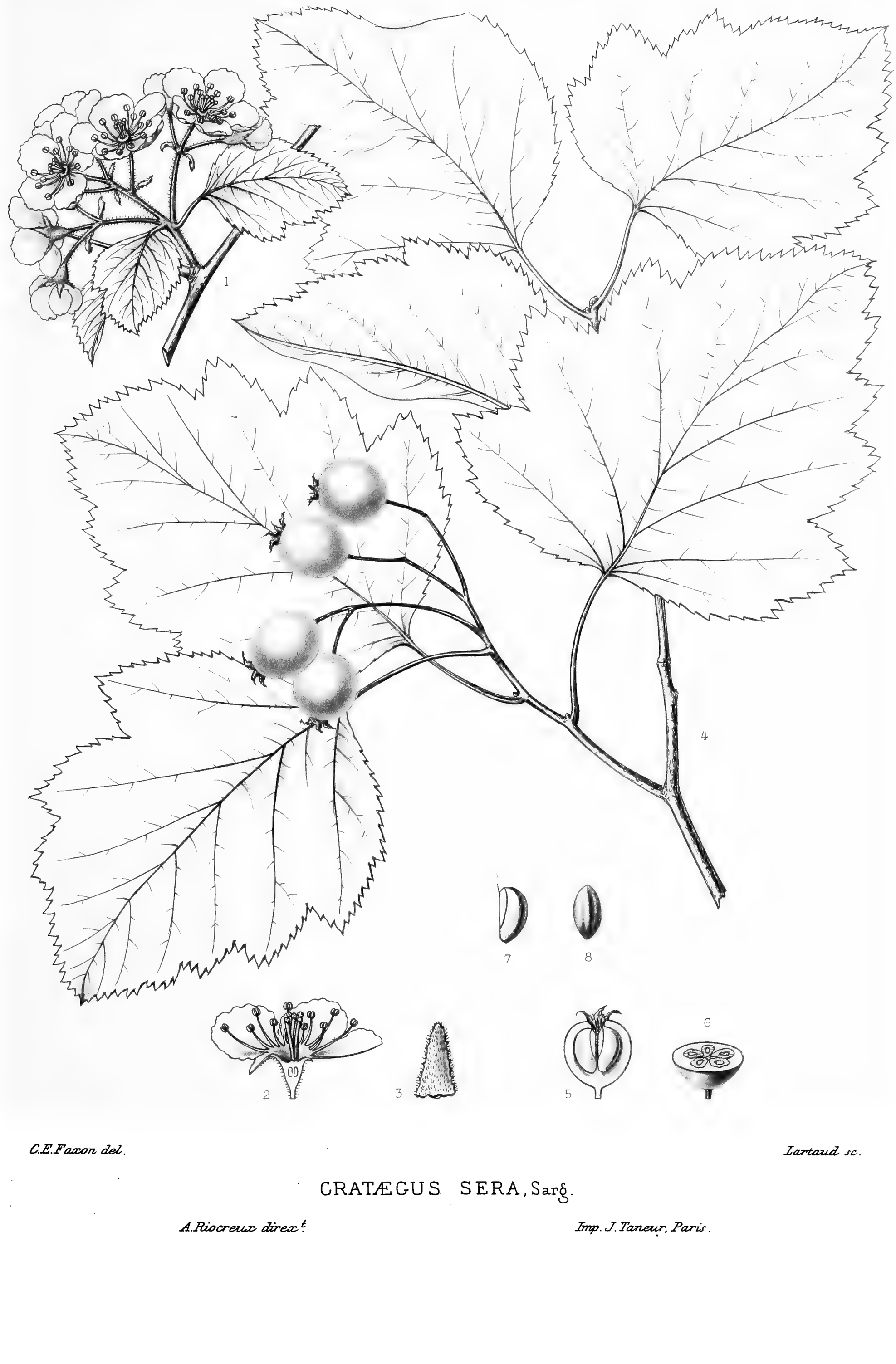
Cratægus sera grows in low moist ground in the neighborhood of streams on Belle Isle in the Detroit River, Michigan, and near Chicago, Illinois, on the bottoms of the Calumet and Desplaines rivers.[1]

[1] I first noticed this handsome Thorn-tree on Belle Isle in May, 1899. It had been previously collected by Mr. E. J. Hill in rich woods adjacent to the Calumet River in 1896 and 1897, and near Glendon Park on the Desplaines River in 1900. It is probable that it has often been confounded with *Cratægus mollis*, and that *Cratægus sera* will be found to be common in southern Michigan, northern Indiana, and northern and central Illinois. From *Cratægus mollis* it differs in its more oblong and much thinner leaves and in its late ripening fruit.

EXPLANATION OF THE PLATE.

PLATE DCLXI. CRATÆGUS SERA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, natural size.
6. Cross section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.



C.E.Faxon del. *Lartaud sc.*

CRATÆGUS SERA, Sarg.

A.Riocreux direx.t *Imp. J.Taneur, Paris.*

CRATÆGUS CANADENSIS.

Haw.

STAMENS 20; anthers white. Leaves ovate, cuneate at the base.

Cratægus Canadensis, Sargent, *Rhodora*, iii. 73 (1901).

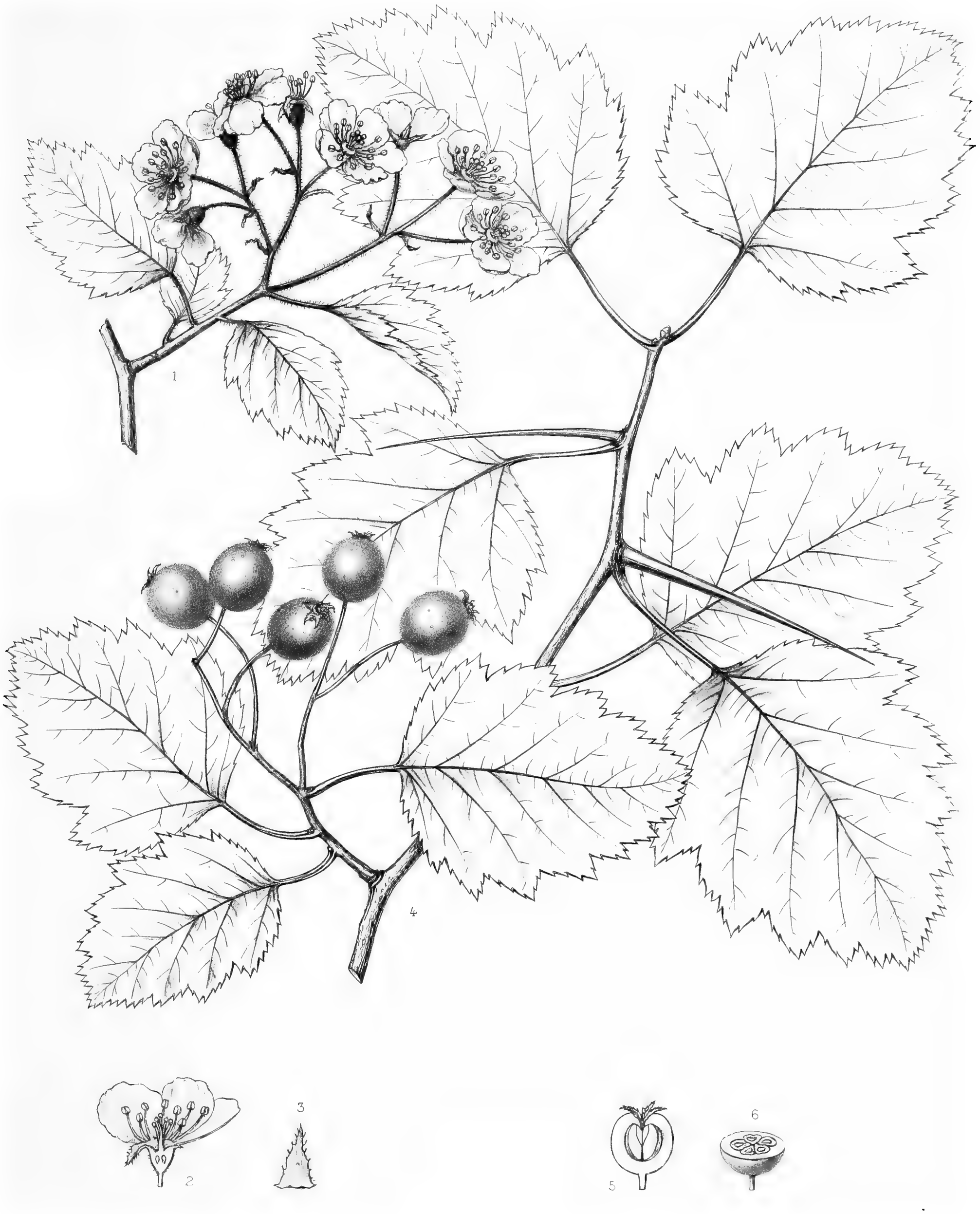
A tree, eighteen or twenty feet in height, with a trunk six or eight inches in diameter covered with pale gray-brown scaly bark, and stout spreading branches which form a broad round-topped symmetrical head. The branchlets are slender, conspicuously zigzag, marked by large oblong pale lenticels, and armed with numerous stout straight or slightly curved dark chestnut-brown shining spines which vary from two inches to two inches and a half in length; dark green and covered with matted pale hairs when they first appear, they become light orange-brown and very lustrous during their first season, and turn ashy gray in their third year. The leaves are ovate, short-pointed at the apex, broadly cuneate or, on leading shoots, truncate at the base, slightly lobed usually only above the middle, with short broad acute lobes, and coarsely and frequently doubly serrate often nearly to the base, with spreading glandular teeth; in early spring they are coated above with soft white hairs and below with dense hoary tomentum, and at maturity they are thin but firm in texture, blue-green and glabrous or scabrous on the upper surface, pale and pubescent on the lower surface, particularly along the slender midribs and primary veins, from two inches to two inches and a half in length and from an inch and a half to nearly three inches in width; they are borne on slender grooved glandular petioles which are often more or less winged above, tomentose at first but ultimately nearly glabrous, and from three quarters of an inch to an inch long. The stipules are linear, finely glandular-serrate, from one half to three quarters of an inch in length, and caducous. The flowers, which open at the end of May and are about three quarters of an inch in diameter, are borne in broad loose compact thin-branched tomentose corymbs, with linear-lanceolate glandular-serrate bracts and bractlets which become dark red in fading. The calyx-tube is broadly obconic and villose, with long matted white hairs, and the lobes are lanceolate, glandular, with large red stipitate glands, villose on both surfaces, and reflexed after the flowers open. There are twenty stamens with small nearly white anthers, and five styles which are surrounded at the base by a thin ring of pale tomentum. The fruit ripens early in October and, falling gradually, does not entirely disappear until after midwinter; it is borne in erect thick-stemmed slightly villose clusters, and is short-oblong or subglobose, crimson, lustrous, marked by large scattered pale dots, slightly villose toward the ends, from one half to five eighths of an inch long and from one third to one half of an inch wide; the calyx-tube is prominent, with a broad deep cavity, and the lobes, which are gradually narrowed from broad bases, are elongated, glandular, villose, spreading or reflexed, and often deciduous before the fruit ripens; the flesh is thin, pale yellow, dry, and mealy. The five nutlets are thin, rounded, and irregularly ridged on the back, and about a quarter of an inch in length.

Cratægus Canadensis inhabits limestone ridges near the St. Lawrence River at Chateaugay, Caughnawaga, and La Tortue, in the Province of Quebec, where it was found in October, 1899, by Mr. J. G. Jack.

EXPLANATION OF THE PLATE.

PLATE DCLXII. CRATÆGUS CANADENSIS.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, natural size.
6. Cross section of a fruit, natural size.



C.E. Faxon del. *Rapine sc.*

CRATÆGUS CANADENSIS, Sarg.

A. Riocreux direct. *Imp. J. Taneur, Paris.*

CRATÆGUS BERLANDIERI.

Haw.

STAMENS 20; anthers yellow. Leaves oblong-obovate to oval, gradually narrowed and cuneate below, thin, dark green, and lustrous.

Cratægus Berlandieri, Sargent, *Bot. Gazette*, xxxi. 230 (1901).

A tree, from fifteen to twenty feet in height, with a tall straight stem eight or ten inches in diameter covered with thin dark brown furrowed bark, and spreading branches forming a broad open head. The branchlets are slender, slightly zigzag, marked by occasional oblong dark lenticels, and unarmed, or armed with few straight gray spines about an inch in length; coated with hoary tomentum when they first appear, they become puberulous, dull reddish brown or yellow-brown by midsummer, and ashy gray late in the autumn or during the following season. The leaves are oblong-obovate or oval, acute or acuminate at the apex, and gradually narrowed, cuneate and entire below the middle, unequally divided above into numerous acute or acuminate lobes, and coarsely and often doubly serrate, with broad straight or incurved gland-tipped teeth; when the flowers open from the middle to the end of March they are coated above with short pale caducous hairs, and below with thick hoary tomentum; and at maturity they are thin but firm in texture, glabrous, dark green, and very lustrous on the upper surface, pale and pubescent below, and usually about three inches long and two inches wide, with slender midribs, remote primary veins extending to the points of the lobes and only slightly impressed on the upper side, conspicuous secondary veins, and reticulate veinlets; they are borne on stout petioles more or less winged toward the apex, tomentose at first but finally pubescent, and from one half to three quarters of an inch in length. The stipules are falcate, long-pointed, entire or finely glandular-serrate, villose, and about a quarter of an inch long. On vigorous leading shoots the leaves are often five inches long and three inches wide, with rounded or acute lobes, and foliaceous, lunate, coarsely glandular-dentate stipules frequently half an inch in length. The flowers are three quarters of an inch in diameter, and are produced on stout elongated pedicels covered with hoary tomentum, which also clothes the stout lax branches of the broad loose many-flowered compound corymbs, with oblong-obovate or lanceolate finely glandular-serrate villose conspicuous bracts and bractlets. The calyx-tube is broadly obconic, covered with thick pale tomentum, and the lobes are broad, acute, very coarsely glandular-serrate, tomentose on the outer surface, villose on the inner surface, and reflexed after the flowers open. There are twenty stamens with slender elongated filaments and small yellow anthers, and five styles surrounded at the base by tufts of white hairs. The fruit, which ripens after the middle of October and hangs in loose drooping clusters, is short-oblong to subglobose, scarlet, and about half an inch long; the calyx-cavity is deep and broad, and the much enlarged lobes are coarsely serrate, villose, erect, and persistent; the flesh is thin, yellow, dry, and mealy. The five nutlets are rounded and occasionally obscurely grooved on the back, and about a quarter of an inch long.

Cratægus Berlandieri inhabits low rich woods on the bottom-lands of the Brazos River near Columbia and Brazoria, Texas, where it is not common and where it was first collected[1] in 1828 by Berlandier,[2] whose specimens of this handsome tree were usually referred to *Cratægus tomentosa* until the collections made by Mr. B. F. Bush[3] in 1899 and 1900 showed its true characters.

[1] As shown by Berlandier's specimens in Herb. Gray (Nos. 267 and 356).

[2] See i. 82.

[3] See vii. 110.

EXPLANATION OF THE PLATE.

PLATE DCLXIII. CRATÆGUS BERLANDIERI.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, natural size.
6. Cross section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.

C.E.Faxon del.

Rapine sc.

CRATÆGUS BERLANDIERI, Sarg.

A.Riocreux direx.t

Imp. J.Taneur, Paris.

CRATÆGUS TEXANA.

Scarlet Haw.

STAMENS 20; anthers dark red. Leaves broadly ovate, cuneate at the base.

Cratægus Texana, Buckley, *Proc. Phil. Acad.* 1861, 454. — Sargent, *Bot. Gazette*, xxxi. 225.

Cratægus mollis, Gray, *Proc. Phil. Acad.* 1862, 163 (not Scheele). — Sargent, *Silva N. Am.* iv. 99 (in part).

A tree, often thirty feet in height, with a tall trunk sometimes a foot in diameter covered with dark closely appressed scales, and thick branches which ascending while the tree is young form an open irregular crown and spread in old age into a broad symmetrical round-topped head. The branchlets are slender, slightly zigzag, marked by large oblong pale lenticels, and armed with occasional thin nearly straight bright chestnut-brown lustrous spines usually about two inches in length, or often unarmed; dark bronze green and villose when they first appear, they soon become dull reddish brown, and, growing lighter-colored in their second season, are ultimately pale ashy gray. The leaves are broadly ovate, acute or rarely rounded at the apex, broadly concave-cuneate or on leading shoots sometimes truncate or slightly cordate at the entire base, coarsely and doubly glandular-serrate, and usually divided above the middle into four or five pairs of wide acute lobes; when they unfold they are covered above with short soft pale hairs, and below with a thick coat of hoary tomentum, and are more than half grown when the flowers open late in March; at maturity they are from three to four inches long and from two and a half to three inches wide, thick and firm in texture, dark green and lustrous on the upper surface, pale and pubescent or tomentose on the lower surface, particularly along the stout light-colored midribs and primary veins and on the prominent secondary veins and reticulate veinlets; they are borne on stout deeply grooved petioles which are more or less winged above, at first tomentose but ultimately nearly glabrous, and from one half to three quarters of an inch in length. The stipules are lunate, apiculate, often stalked, coarsely serrate, and from an inch and a quarter to an inch and a half in length. The flowers are three quarters of an inch in diameter, and are produced on elongated slender pedicels, in broad open many-flowered compound tomentose corymbs, with oblong or oblong-obovate broad acute villose conspicuous bracts and bractlets often half an inch long. The calyx-tube is broadly obconic and coated with pale tomentum, and the lobes are foliaceous, gradually narrowed from broad bases, acuminate, coarsely glandular-serrate, villose, with long matted pale hairs, and reflexed after the flowers open. There are twenty stamens with large dark red anthers, and five styles surrounded at the base by a narrow ring of pale tomentum. The fruit ripens toward the end of October, and is borne in drooping many-fruited tomentose ultimately glabrous clusters; pear-shaped and tomentose until nearly grown, when fully ripe it is short-oblong or slightly obovate, rounded at the ends, bright scarlet, marked by occasional large pale dots, puberulous toward the apex, and from three quarters of an inch to an inch in length, with a broad deep calyx-cavity and much enlarged glandular-serrate usually erect lobes dark red at the base on the upper side, and often deciduous before the ripening of the fruit; the flesh is thick, yellow, sweet, and edible. The five nutlets are thick, slightly grooved on the back, and from one quarter to one third of an inch in length.

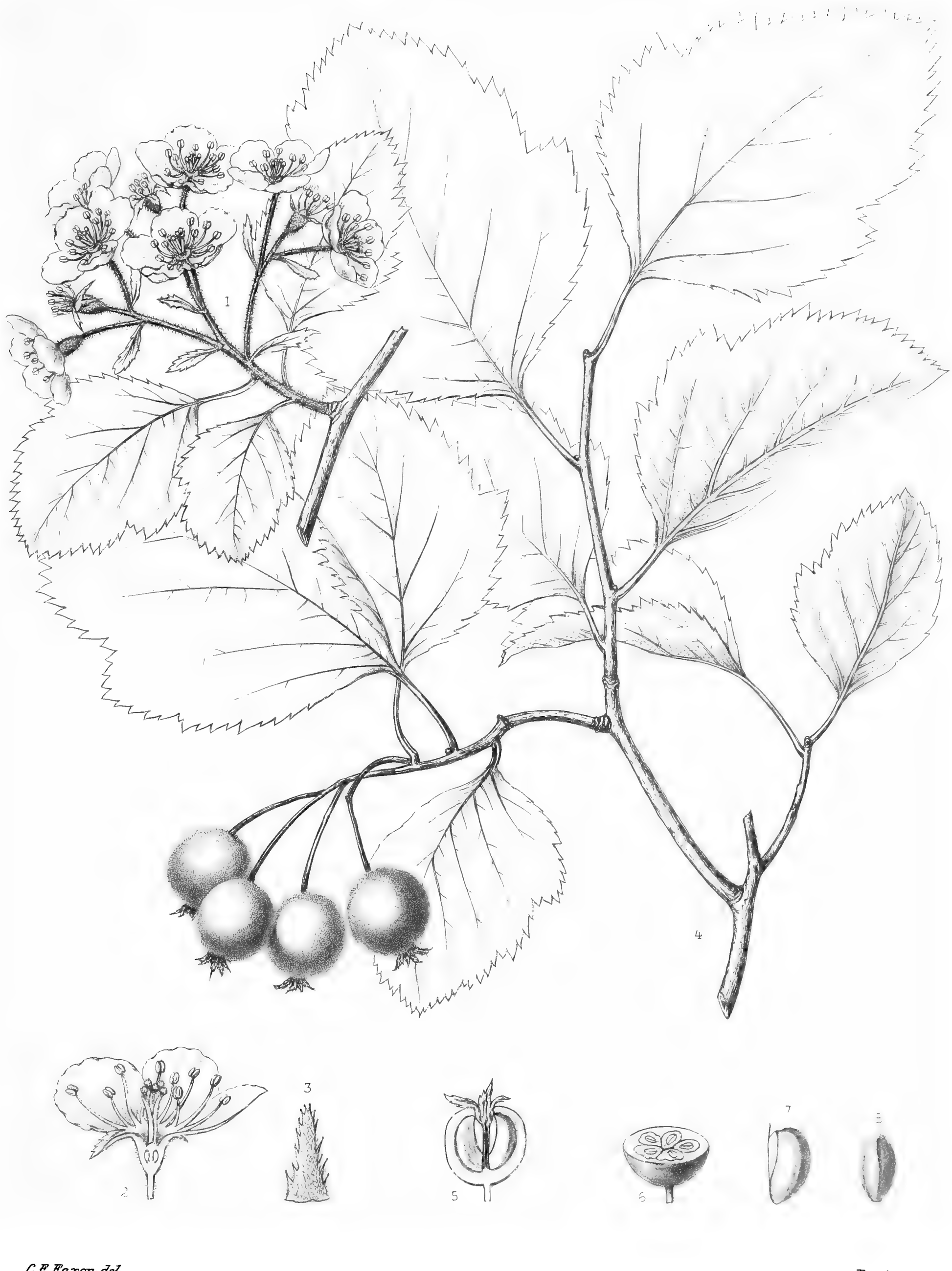
Cratægus Texana inhabits rich bottom-lands in central and western Texas, where it was first distinguished by Mr. S. B. Buckley.[1]

[1] See iii. 3.

EXPLANATION OF THE PLATE.

PLATE DCLXIV. CRATÆGUS TEXANA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, natural size.
6. Cross section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.



C.E. Faxon del

Rapine sc.

CRATÆGUS TEXANA, Buckl

A. Riocreux direx^t

Imp. J. Taneur, Paris.

CRATÆGUS QUERCINA.

Haw.

STAMENS 20; anthers dark red. Leaves oval to obovate, membranaceous, dark green and lustrous above, canescent below.

Cratægus quercina, Ashe, *Jour. Elisha Mitchell Sci. Soc.* xviii. pt. i. 27 (1902).

Cratægus Columbiana, Sargent, *Bot. Gazette*, xxxi. 229 (not Howell) (1901).

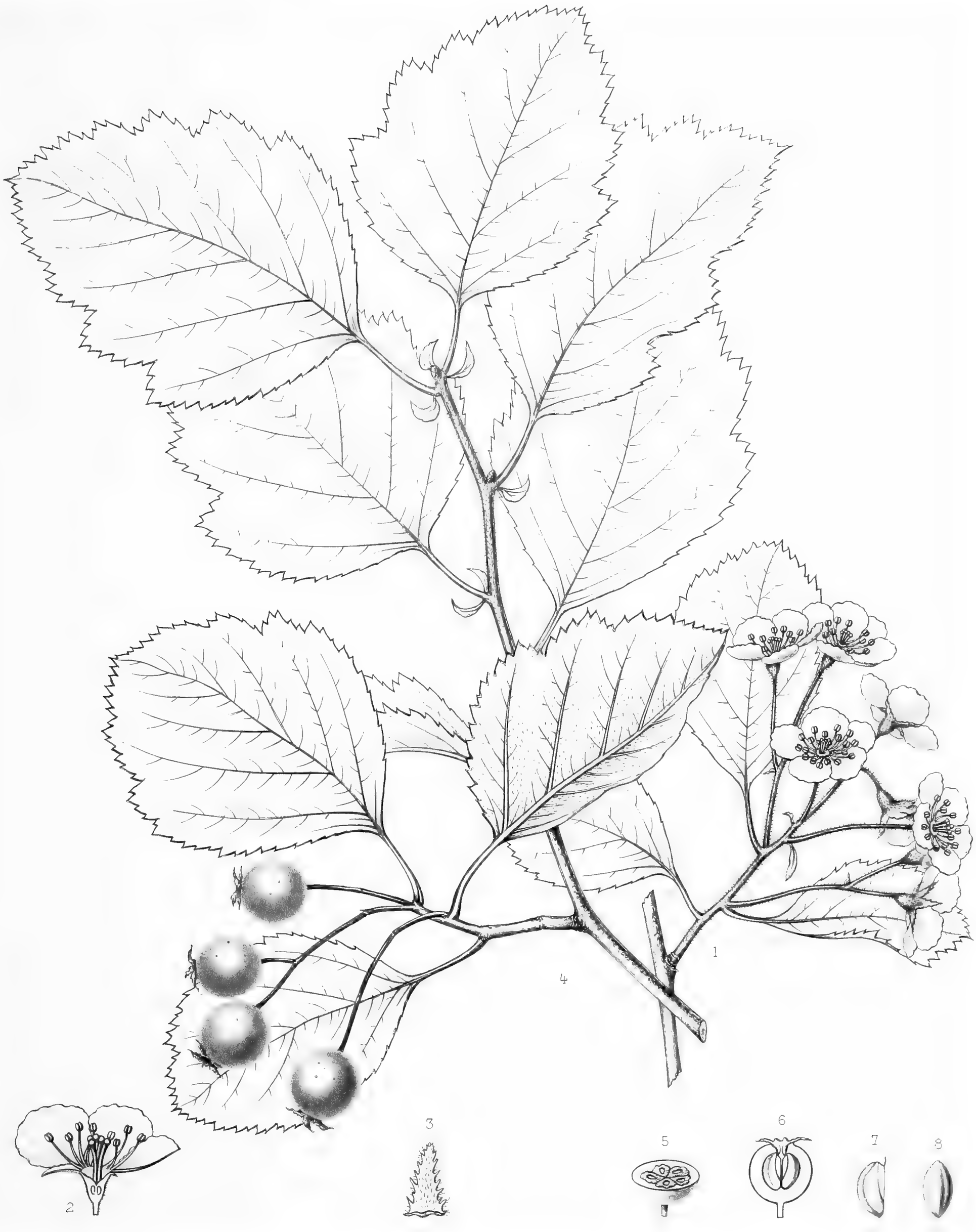
A tree, remarkable in early spring for the lustre of the white coating of tomentum on the branchlets and under side of the leaves, occasionally twenty-five feet in height, with a tall trunk from six to eight inches in diameter, and ascending branches which form a broad symmetrical head. The bark of the trunk, which is light gray and broken into small closely appressed scales, becomes near the base of old trees deeply furrowed and nearly black. The branchlets are slender, somewhat zigzag, marked by many small lenticels, and armed with numerous straight or slightly curved chestnut-brown lustrous spines usually from an inch to an inch and a quarter in length; coated when they first appear with hoary tomentum, they become light red-brown and more or less villose during their first season, glabrous and rather darker in their second year, and ultimately pale ashy gray. The leaves vary from oval to obovate and are usually acute or occasionally rounded at the apex, full and rounded and gradually or abruptly narrowed to the entire base, and irregularly doubly serrate above, with slender glandular teeth; they are conspicuously plicate when they unfold, and the upper surface, which is coated with long soft pale hairs, is then often dark red and the lower surface is covered with a thick coat of silvery white shining tomentum; and at maturity they are thin but firm in texture, dark green, lustrous and scabrous above, pale and pubescent or tomentose below, and from two inches to two inches and a half long and broad, with slender midribs and four or five pairs of thin primary veins only slightly impressed on the upper side and conspicuous reticulate veinlets; they are borne on stout tomentose petioles about half an inch long, and their stipules are narrow, falcate, acuminate, and finely glandular-serrate. On leading shoots the leaves are broadly ovate or oblong-oval, full and rounded at the base, somewhat divided into three or four pairs of short acute lobes, and frequently four inches long and broad, with foliaceous lunate coarsely glandular-dentate stipitate stipules frequently three quarters of an inch in length. The flowers open from the middle to the end of March when the leaves are only about one third grown, and are three quarters of an inch in diameter; they are produced on long slender pedicels, in broad many-flowered thin-branched lax corymbs covered with hoary tomentum, with oblong-obovate glandular-serrate villose bracts and bractlets acute or rounded and apiculate at the apex. The calyx-tube is narrowly obconic and coated with hoary tomentum, and the lobes are short, acute, coarsely glandular-serrate, tomentose on both surfaces, and reflexed after the flowers open. There are twenty stamens with slender elongated filaments and small dark red anthers, and five styles surrounded at the base by tufts of long snow-white hairs. The fruit ripens after the middle of October and hangs in few-fruited tomentose spreading clusters; it is subglobose but often rather longer than broad, full and rounded at the ends, tomentose until nearly fully grown but glabrous at maturity, dark red, marked by numerous large pale dots, and about one half of an inch in diameter; the calyx is prominent, with a broad deep cavity and short spreading often deciduous lobes; the flesh is thin, light yellow, hard, and dry, and generally shrivels before the fruit falls. The five nutlets are rounded and usually ridged on the back, and about a quarter of an inch long.

Cratægus quercina inhabits the sandy bottom-lands of the Brazos River at Columbia, Texas, where it grows in open Live Oak forests and where it was discovered in November, 1899, by Mr. B. F. Bush.

EXPLANATION OF THE PLATE.

PLATE DCLXV. CRATÆGUS QUERCINA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Cross section of a fruit, natural size.
6. Vertical section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.



C.E. Faxon del.

Lartaud sc.

CRATÆGUS QUERCINA, Ashe.

A. Riocreux direx.t

Imp. J. Taneur, Paris.

CRATÆGUS PYRIFORMIS.

Haw.

STAMENS 20; anthers pale rose color. Leaves oval to broadly ovate, cuneate at the base.

Cratægus pyriformis, Britton, *Bull. N. Y. Bot. Gard.* i. 449 (1900); *Man.* 522.

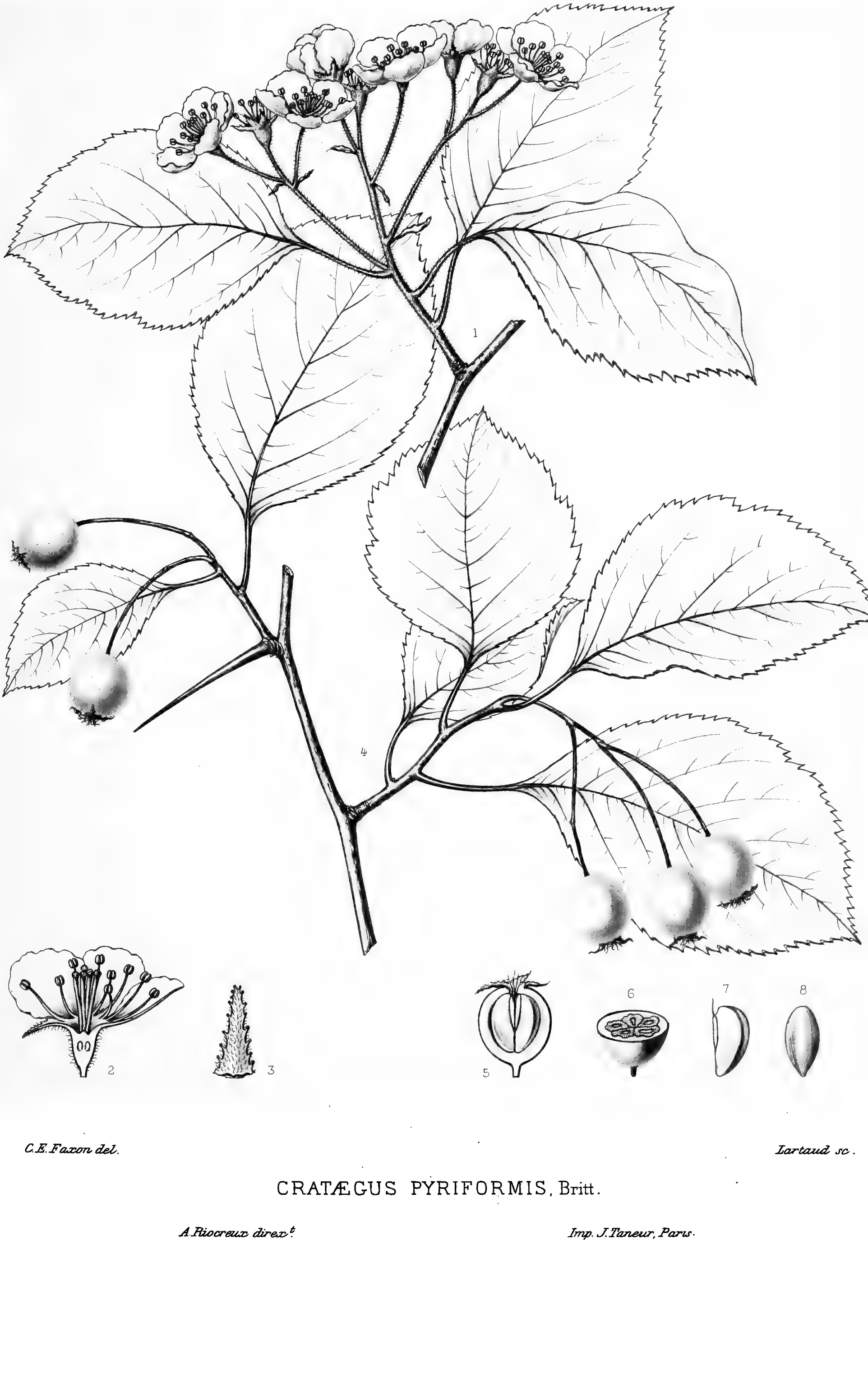
A tree, twenty-five or thirty feet in height, with a trunk a foot in diameter covered with thick dark scaly bark, and spreading branches forming a broad symmetrical head. The branchlets are slender, somewhat zigzag, marked by small oblong pale lenticels, and armed with occasional thin nearly straight bright chestnut-brown lustrous spines usually about an inch and a half in length; light green and villose when they first appear, with long matted pale hairs, they are dull red-brown and pubescent in their first summer, light brown and glabrous the following year, and ultimately ashy gray. The leaves are oval or broadly ovate, acute and often short-pointed at the apex, gradually narrowed and concave-cuneate at the entire base, sharply and sometimes doubly serrate above, with straight glandular teeth, and often slightly and irregularly lobed above the middle; when the flowers open about the tenth of May they are fully grown and membranaceous, light yellow-green, roughened on the upper surface by short rigid pale hairs and pubescent on the lower surface, particularly along the slender midribs and five or six pairs of remote primary veins; and at maturity they are thin and firm, lustrous and scabrous on the upper surface, pale and pubescent on the lower surface, and generally about three inches long and two inches wide; they are borne on slender grooved tomentose ultimately pubescent petioles broadened at the apex by the decurrent bases of the leaf-blades, and from an inch to an inch and a quarter in length. The stipules are minute, linear-lanceolate, bright red, and caducous. On vigorous leading shoots the leaves are usually ovate, coarsely serrate, more deeply lobed than the leaves of fertile branchlets, and frequently four or five inches long and three or four inches wide, with foliaceous lunate acuminate villose coarsely serrate stipules sometimes half an inch long. The flowers are an inch in diameter, and are produced on elongated slender tomentose pedicels, in broad compound many-flowered lax corymbs, with linear-lanceolate or oblanceolate glandular-serrate elongated caducous bracts and bractlets. The calyx-tube is narrowly obconic and villose, and the lobes are narrow, acuminate, glandular-serrate, and more or less villose. There are twenty stamens with pale rose-colored anthers, and four or usually five styles surrounded at the base by a broad ring of white tomentum. The fruit ripens in October, and hangs on long slender pubescent pedicels, in drooping few-fruited clusters; it is obovate, full and rounded at the ends, bright cherry-red, lustrous, marked by occasional large pale dots, and about five eighths of an inch long and one half of an inch wide; the calyx is prominent, with a broad shallow cavity, and linear glandular-serrate closely appressed lobes often deciduous before the fruit ripens; the flesh is thin, light yellow, and juicy. The four or usually five nutlets are deeply divided along the back into two rounded ridges, dark brown, and five eighths of an inch in length.

Cratægus pyriformis grows on the rich bottom-lands of streams in Ripley County, southeastern Missouri, where it was discovered near Monteer in August, 1899, by Mr. B. F. Bush.

EXPLANATION OF THE PLATE.

PLATE DCLXVI. CRATÆGUS PYRIFORMIS.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, natural size.
6. Cross section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.



C.E. Faxon del. *Lartaud sc.*

CRATÆGUS PYRIFORMIS, Britt.

A. Riocreux direx.t *Imp. J. Taneur, Paris.*

CRATÆGUS CORUSCA.

Haw.

STAMENS 20; anthers pale pink. Leaves ovate, firm, bright, and shining.

Cratægus corusca, Sargent, *Bot. Gazette*, xxxiii. 117 (1902).

A tree, eighteen or twenty feet in height, with a tall trunk eight or ten inches in diameter, and wide-spreading branches which form a handsome symmetrical head. The bark of the trunk is thin, light gray-brown, and broken into small closely appressed scales. The branchlets are stout, marked by numerous small white lenticels, and armed with thick nearly straight bright chestnut-brown spines often three inches in length; dark green and coated with matted pale hairs when they first appear, during their first summer they become bright red-brown, and in their second year light orange-brown and very lustrous. The leaves are ovate, acute, truncate, rounded or slightly cordate at the broad base, regularly divided into four or five pairs of short acute lateral lobes, and doubly serrate, with straight slender glandular teeth; in early spring they are covered on the upper surface with short soft pale hairs and are glabrous on the lower surface, and at maturity, although thin, they are firm and rigid in texture, glabrous, dark yellow-green and very bright and shining above, pale yellow-green below, and from two inches to two inches and a half long and wide, with slender pale midribs and primary veins only slightly impressed on the upper side; they are borne on slender, nearly terete, slightly grooved petioles which, villose at first, soon become glabrous and dark red below the middle, and are from one inch and a half to two inches and a half in length. The stipules are narrowly obovate, acute, and coarsely glandular-serrate. On vigorous leading shoots the leaves are frequently divided into narrow acute lobes, and are from three and a half to four inches long and wide, with lunate coarsely dentate stipules from one half to three quarters of an inch broad. The flowers, which are three quarters of an inch in diameter, open about the middle of May and are borne in compact rather narrow compound many-flowered corymbs covered with matted pale hairs, and furnished with linear-lanceolate or narrowly obovate glandular-serrate bracts and bractlets. The calyx-tube is broadly obconic, and glabrous or villose below, and the lobes, which are gradually narrowed from broad bases, are acute, coarsely glandular-serrate, and villose on the inner surface. There are twenty stamens with small pale pink anthers, and four or five styles. The fruit begins to ripen and fall about the twentieth of September, and continues to fall until the end of October; it is borne in glabrous drooping few-fruited clusters on stout pedicels which vary from three quarters of an inch to nearly an inch in length; it is oblong or obovate, bright cherry-red, lustrous, marked by scattered dark dots, from five eighths to three quarters of an inch in length and from one half to five eighths of an inch in width; the calyx-cavity is deep but comparatively narrow, and the lobes are gradually narrowed, acute, slightly glandular-serrate, and usually deciduous before the fruit ripens; the flesh is thick, yellow, dry, and mealy. The four or five nutlets are dark-colored, rounded on the back, and a quarter of an inch long.

Cratægus corusca inhabits the sandy shores of Lake Zurich in Lake County, Illinois, where it was discovered in September, 1899, by Mr. E. J. Hill.[1]

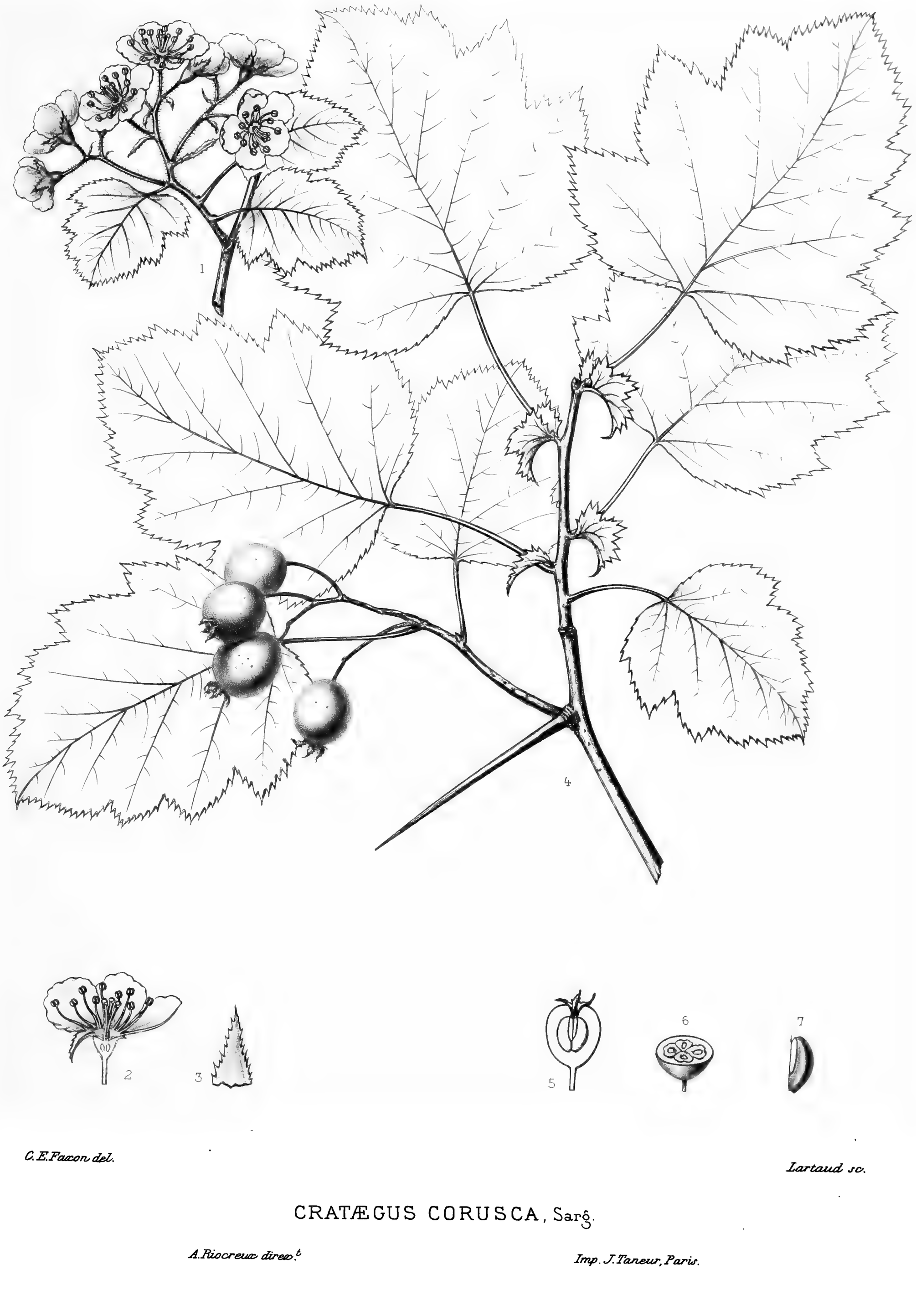
[1] Ellsworth Jerome Hill (December 1, 1833) was born at Le Roy, New York, where his father, a descendant of one of the colonists from England who settled at Guilford, under Nathaniel Whitfield, had moved from Middlesex County, Connecticut. An early love of reading induced his parents to allow the boy to attend a village academy during the winter months with the idea of his becoming a teacher; the summers were spent in helping his father in farm work. In order to secure a college education he engaged in teaching while still a boy, but his health breaking down he was obliged to reside for three years in the south, and it was not until 1860 that Mr. Hill entered the Union Theological Seminary in the city of New York. Graduating three years later, he went to Illinois

and engaged in pastoral work in the Presbyterian Church until 1869, when ill health compelled him to retire. Two years later he became a teacher again until 1888, when he found himself in a position to devote his time to the study of botany in which he had been interested, as well as in geology and other natural sciences, since boyhood. Mr. Hill's botanical work, which includes the collection of a large herbarium and valuable library, has been carried on chiefly in the region bordering the western shores of Lake Michigan, especially in the neighborhood of Chicago, where he has resided for several years. He has published the results of these studies in many papers communicated to the *Bulletin of the Torrey Botanical Club*, *The Botanical Gazette*, *Garden and Forest*, *The Naturalist*, and other technical journals. For the last two or three years Mr. Hill has been particularly interested in the genus Cratægus, in which he has discovered a number of new and interesting forms.

EXPLANATION OF THE PLATE.

PLATE DCLXVII. CRATÆGUS CORUSCA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, natural size.
6. Cross section of a fruit, natural size.
7. A nutlet, side view, enlarged.



C. E. Faxon del. *Lartaud sc.*

CRATÆGUS CORUSCA, Sarg.

A. Riocreux direx.t *Imp. J. Taneur, Paris.*

CRATÆGUS SUBMOLLIS.

Red Haw.

STAMENS 10; anthers pale yellow. Leaves ovate, acute, membranaceous, dark yellow-green.

Cratægus submollis, Sargent, *Bot. Gazette*, xxxi. 7 (1901).

Cratægus tomentosa, Emerson, *Trees Mass.* 435 (not Linnæus) (1846); ed. 2, ii. 494, t.

Cratægus coccinea, var. **mollis**, Watson & Coulter, *Gray's Man.* ed. 6, 165 (in part) (1890).

Cratægus mollis, Sargent, *Silva N. Am.* iv. 99 (in part), t. 182 (not Scheele) (1892). — Koehne, *Herb. Dendr.* No. 232.

Cratægus coccinea subvillosa, Lange, *Rev. Spec. Gen. Cratægi*, 31, f. (not *Cratægus subvillosa*, Torrey) (1897).

A tree, from twenty to twenty-five feet in height, with a tall trunk occasionally a foot in diameter covered with light gray-brown scaly bark, and ascending or spreading ashy gray branches forming a broad handsome head; or often a tall intricately branched shrub. The branchlets are slender, more or less zigzag, marked by small oblong orange-colored lenticels, and armed with numerous thin straight or somewhat curved bright chestnut-brown shining spines from two inches and a half to three inches in length; dark green and coated with hoary tomentum when they first appear, they become light or dark orange-brown by midsummer, when they are still slightly tomentose, and during their first autumn they are glabrous, lustrous, and light red-brown or dark orange-brown; they are gray tinged with green or pale orange-brown during their second summer, and finally slowly losing their lustre turn ashy gray. The leaves are ovate, acute, gradually narrowed and cuneate at the nearly entire base, coarsely doubly serrate above, with straight glandular teeth, and divided into three or four pairs of short acute lobes; at the end of May or early in June when the flowers open they are about half grown, and are then roughened on the upper surface by short stiff pale hairs and are soft-pubescent below, particularly along the midribs and veins, and in the autumn they are membranaceous, dark yellow-green and scabrous above, pale below, from three inches to three inches and a half long and from two inches to two inches and a half wide, with thick yellow midribs and remote primary veins only slightly impressed on the upper side and puberulous on the lower side; they are borne on stout nearly terete grooved petioles more or less winged at the apex, tomentose when they first appear, puberulous at maturity, often bright red toward the base, and from one to two inches long. The stipules vary from linear to narrowly obovate and are acute, glandular-serrate, tomentose, and from one third to one half of an inch in length. On vigorous leading shoots the leaves are broadly ovate, cuneate, rounded, truncate or occasionally slightly cordate at the base, often four inches long and from three inches to three inches and a half wide, with lunate coarsely glandular-dentate stipules frequently nearly an inch in length. The flowers are an inch in diameter, in broad many-flowered thick-branched tomentose compound corymbs, with narrowly obovate acute coarsely glandular-serrate tomentose bracts and bractlets. The calyx-tube is narrowly obconic and covered with a thick coat of long matted white hairs, and the lobes are gradually narrowed from broad bases and are acute, glandular, with large red stipitate glands, glabrous, or sometimes villose on the outer surface, and usually spreading when the flowers open. There are ten stamens with slender elongated filaments and small pale yellow anthers, and from three to five styles surrounded at the base by a narrow ring of long white hairs. The fruit, which ripens and falls in Massachusetts during the first half of September, hangs on elongated slender villose pedicels, in broad gracefully drooping many-fruited clusters; it is pear-shaped, bright orange-red, lustrous, marked by large scattered pale dots, puberulous toward the base, and about three quarters of an inch long; the calyx is much enlarged, and persistent, with a broad deep cavity and erect coarsely glandular-serrate lobes; the flesh is yellow,

thin, subacid, dry, and mealy. The nutlets, which are usually five in number, are rounded and slightly ridged on the back, and about a third of an inch in length.

Cratægus submollis inhabits rich damp hillsides and the borders of woods and roads, and is distributed from the valley of the St. Lawrence River, where it has been found near Montreal and the city of Quebec, to the valley of the Penobscot River and Gerrish Island, Maine, and to eastern Massachusetts, where, although widely scattered in the neighborhood of the coast, it is not common.[1]

[1] It was this species which appears as *Cratægus mollis* on plate clxxxii. in the fourth volume of this work, for it was then supposed that the Massachusetts tree was identical with the *Cratægus mollis* of the Mississippi basin. From that species it is now known to differ in its smaller and less tomentose more deeply lobed and usually cuneate leaves, in its ten not twenty stamens, in its much less downy smaller pear-shaped fruits drooping on slender pedicels, and in the color of its branchlets. Figure 4 on plate clxxxii. represents one of the subglobose fruits of *Cratægus mollis*.

CRATÆGUS ARNOLDIANA.

Scarlet Haw.

STAMENS 10; anthers pale yellow. Leaves ovate or rarely oval, thin, dark green, and lustrous.

Cratægus Arnoldiana, Sargent, *Bot. Gazette*, xxxi. 221 (1901).

A tree, from fifteen to twenty feet in height, with a short trunk ten or twelve inches in diameter, and stout ascending branches which form a broad open irregular head. The bark of young stems and large branches is thin, smooth, and light gray, but near the base of old trunks it becomes nearly black and is broken into large closely appressed thick scales. The branchlets are slender, very zigzag, and armed with many stout straight or slightly curved bright chestnut-brown shining spines which vary from two inches and a half to three inches in length and retain their brilliancy for four or five years; clothed with long matted pale hairs when they first appear and marked by numerous large oblong pale lenticels, the branchlets become dark orange-brown and very lustrous before midsummer, glabrous or puberulous during their first winter, bright orange-brown or gray-brown during their second season, and finally ashy gray. The winter-buds are oblong, gradually narrowed to the obtuse apex, bright red and lustrous, and about three sixteenths of an inch long. The leaves are broadly ovate or rarely oval, acute at the apex, irregularly divided above the middle into numerous short acute lobes, and coarsely doubly serrate, with straight glandular teeth except at the rounded truncate or occasionally cuneate base; when they unfold they are coated with dense matted pale hairs, and at maturity are membranaceous, smooth, very dark green and lustrous on the upper surface, paler on the lower surface, from two to three inches long and broad, and slightly villose on the under side of the slender midribs and the thin although prominent remote primary veins which extend to the points of the lobes and are but little impressed above; they are borne on slender nearly terete petioles which vary from three quarters of an inch to an inch and a half in length, and at first densely villose are ultimately puberulous. The stipules are linear, coarsely glandular-serrate, often an inch long, and caducous. The flowers, which are three quarters of an inch in diameter, open during the last week in May and are borne on slender pedicels, in broad compound many-flowered thin-branched tomentose corymbs, with lanceolate or oblanceolate coarsely glandular-serrate bracts. The calyx-tube is broadly obconic and densely tomentose, and the lobes are narrow, elongated, acuminate, glandular-serrate, villose on both surfaces, and reflexed after the flowers open. There are ten stamens with slender filaments and large pale yellow anthers, and from three to five but usually three or four styles which are surrounded at the base by a broad ring of thick white tomentum. The fruit, which ripens about the middle of August and falls before the first of September, is borne on stout pedicels, in erect spreading or rarely drooping few-fruited villose clusters; it is subglobose, but rather longer than broad, bright crimson, marked by numerous large pale dots, villose particularly toward the ends, with long scattered white hairs, and three quarters of an inch long; the calyx-cavity is broad and shallow, and the lobes are elongated, coarsely glandular-serrate, villose, wide-spreading, and often deciduous before the fruit ripens; the flesh is thick, bright yellow, and subacid. The three or four nutlets are thick, light-colored, prominently ridged on the back, with high rounded ridges, and about a quarter of an inch long.

Cratægus Arnoldiana forms thickets on a dry bank in the Arnold Arboretum, where for many years it was confounded with the *Cratægus mollis* of Illinois, and grows in the valley of the Mystic

River at Medford, Massachusetts.[1] It is now common in parks and gardens in the neighborhood of Boston, where it develops a tall straight stem and promises to grow to a large size.

This handsome Thorn is named in memory of James Arnold,[2] through whose enlightenment and liberality the establishment of the Arnold Arboretum was made possible.

[1] Two large tree-like plants of *Cratægus Arnoldiana* have been found by Mr. L. L. Dame at the foot of a wooded bank on the Mystic River near the end of Hastings Lane, West Medford.

[2] James Arnold (September 9, 1781–December 3, 1868), a native of Providence, Rhode Island, was a strong member of a strong New England family, born neither to poverty nor riches. On October 29, 1807, he married Sarah, daughter of William Rotch, Jr., of New Bedford, and removed to that town to become the business partner of his father-in-law, who was engaged in whale-fishing. Mr. Arnold devoted himself to his business with such energy and intelligence that he was able to retire from its active pursuit with a large fortune at the age of fifty. He was described as a man of acute and powerful intellect, able to compel success in whatever direction his judgment might determine. The book of nature had probably little charm for him, although his garden was long famous as the most beautiful in southern Massachusetts. Originally laid out on straight rectangular lines, it was transformed by an excellent Welsh gardener, Llewellyn, into a delightful retreat with winding walks and shrubbery arranged to conceal the boundaries, to open and close vistas, and to give to an area of about three acres an idea of extent far beyond its true dimensions.

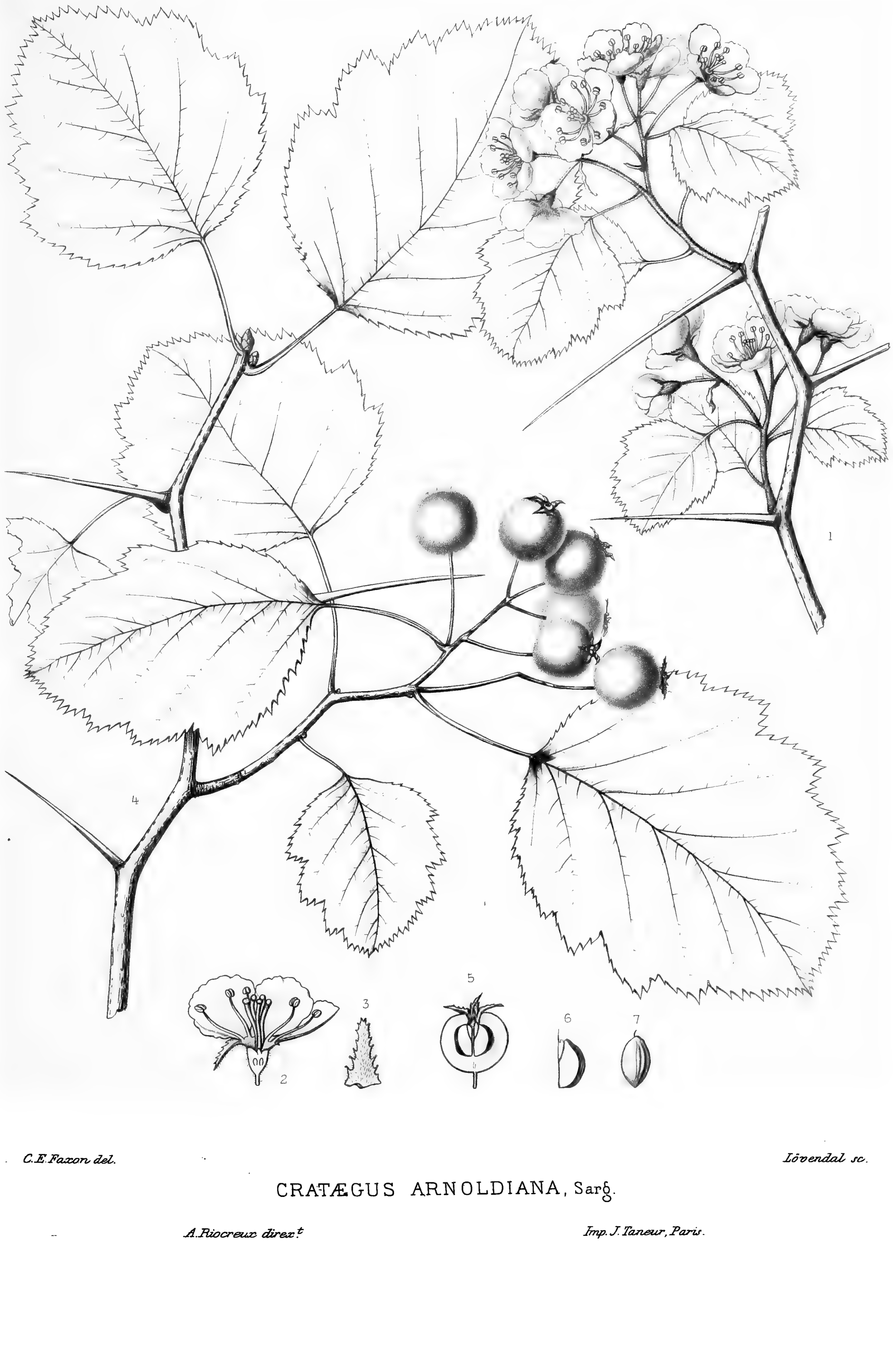
One of Mr. Arnold's friends was George B. Emerson, the author of *A Report on the Trees and Shrubs growing naturally in the Forests of Massachusetts*. Mr. Arnold had great confidence in Mr. Emerson's judgment in everything that related to agriculture and horticulture, and there is little doubt that it was at his suggestion that this clause was inserted in Mr. Arnold's will: "To George B. Emerson, John James Dixwell and Francis E. Parker, Esqrs of Boston, in trust, to be by them applied for the promotion of agricultural or horticultural improvements or other philosophical or philanthropical purposes at their discretion, and to provide for the continuance of this Trust hereafter to such persons, on such conditions as they or a majority of them may deem proper, to carry out the intention of the donor, one and one-quarter of one of said twenty-four parts."

These trustees under the inspiration, no doubt, of Mr. Emerson, seconded certainly by John James Dixwell, who was a lover and successful cultivator of trees, conceived the idea of an arboretum to be established in Massachusetts, and made with the Corporation of Harvard College the arrangement by which the Arnold Arboretum was secured for the University.

EXPLANATION OF THE PLATE.

Plate DCLXVIII. Cratægus Arnoldiana.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, natural size.
6. A nutlet, side view, enlarged.
7. A nutlet, rear view, enlarged.



C.E. Faxon del. *Lövendal sc.*

CRATÆGUS ARNOLDIANA, Sarg.

A. Riocreux direx.t *Imp. J. Taneur, Paris.*

CRATÆGUS CHAMPLAINENSIS.

Haw.

STAMENS 10; anthers light yellow. Leaves ovate, acute, thick, blue-green.

Cratægus Champlainensis, Sargent, *Rhodora*, iii. 20 (1901).

A tree, from fifteen to twenty feet in height, with a tall stem eight or ten inches in diameter covered with dark deeply fissured bark broken on the surface into thin loose plate-like scales, and stout wide-spreading branches which form a round-topped and often symmetrical head. The branchlets are slender, somewhat zigzag, marked by numerous large oblong pale lenticels, and armed with straight or slightly curved chestnut-brown spines from an inch and a half to two inches in length; light green and coated with hoary tomentum when they first appear, they become glabrous and light chestnut-brown and lustrous during their first season and ashy gray during their second year. The leaves are ovate, acute, rounded, truncate, slightly cordate or broadly cuneate at the base, usually divided into two or three pairs of short narrow acute lobes, and coarsely and frequently doubly serrate, with glandular teeth; in early spring they are roughened above by short pale hairs and are villose-pubescent below, and at maturity they are thick and firm in texture, conspicuously blue-green and glabrous on the upper surface, light yellow-green on the lower surface, which is somewhat pubescent on the slender midribs and remote primary veins, from two inches to two inches and a half long and from an inch to an inch and a half wide; they are borne on slender deeply grooved petioles which, more or less tomentose at first, usually become glabrous and bright red below the middle before the autumn, and are from three quarters of an inch to an inch in length. The flowers, which are three quarters of an inch in diameter and open during the first week in June, are borne on short slender pedicels, in compact few-flowered compound densely villose corymbs, with lanceolate or oblanceolate coarsely glandular-serrate caducous bracts and bractlets. The calyx-tube is narrowly obconic and coated with thick hoary tomentum, and the lobes are lanceolate, finely glandular-serrate, tomentose on the outer surface usually only below the middle, villose on the inner surface, and reflexed after the flowers open. There are ten stamens with small light yellow anthers, and five styles surrounded at the base by tufts of pale hairs. The fruit, which ripens early in September and remains on the branches until after the new year, is borne on short pedicels, in compact erect villose clusters; it is obovate or oblong, bright scarlet, marked by scattered pale lenticels, and more or less villose or pubescent toward the ends; the calyx is prominent and persistent, with a long tube and broad shallow cavity, and the lobes are gradually narrowed from broad bases, acuminate, finely glandular-serrate, villose, dark red on the upper side below the middle, and spreading or erect; the flesh is thick, yellow, dry, and mealy. The five nutlets are thick, broadly ridged on the back, and five sixteenths of an inch in length.

Cratægus Champlainensis grows on heavy clay soil, and is a frequent inhabitant of the limestone ridges of the Champlain valley, from Middlebury, Vermont, and Crown Point, New York, northward, and of the valley of the St. Lawrence, where it has been found at Chateaugay, Adirondack Junction, and Caughnawaga in the Province of Quebec, and where it was discovered in September, 1899, by Mr. J. G. Jack.[1]

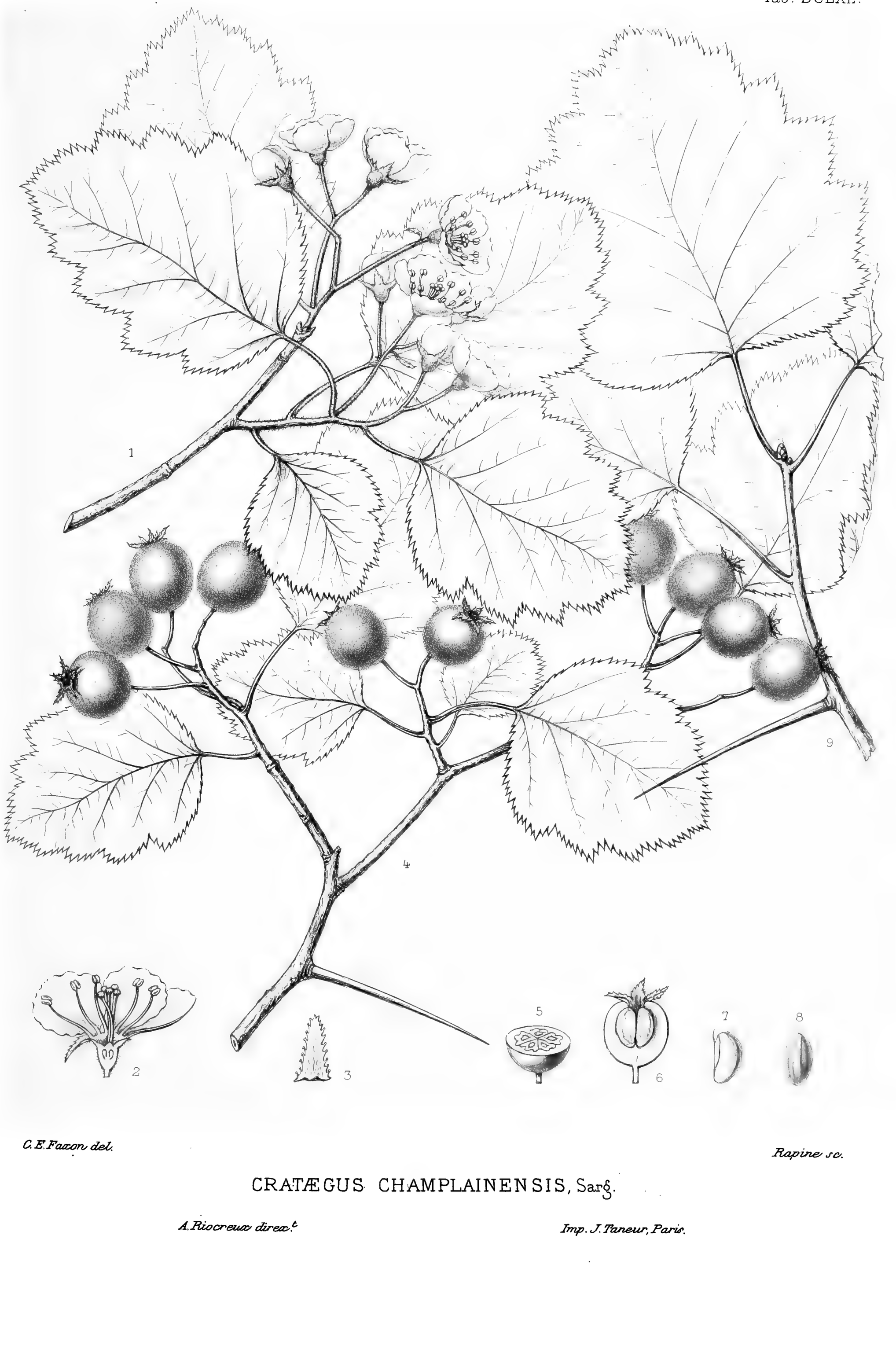
[1] John George Jack (April 15, 1861) was born at Chateaugay near Montreal in the Province of Quebec, the son of a Scotch farmer of French Huguenot descent who came to Canada with his father's family about 1830, and later engaged in farming and in fruit-growing until his death in 1900, testing during his career as a fruit-grower of more than forty years hundreds of varieties of

fruits previously unknown in the Province of Quebec. J. G. Jack's early education was obtained principally in the schools near his home and in working on his father's farm, and later at Cambridge, where he spent two winters in studying entomology with Dr. H. A. Hagen. He spent the summer of 1883 in the private horticultural experiment grounds of Mr. E. S. Carmen, editor of *The Rural New Yorker*, at River Edge, New Jersey, and in 1886 he became connected with the Arnold Arboretum as an assistant and teacher of dendrology. He passed the summers of 1898 and 1900 as an agent of the Geological Survey and of the Department of Agriculture of the United States in exploring the forests of central Colorado and of the Big Horn Mountains of Wyoming. In 1900 Mr. Jack became instructor in dendrology in the Massachusetts Institute of Technology, in addition to his duties in the Arboretum. For many years he was a constant contributor to *Garden and Forest*. In the neighborhood of Montreal he has discovered a number of previously unknown forms of Cratægus. (See Sargent, *Rhodora*, iii. 71.)

EXPLANATION OF THE PLATE.

PLATE DCLXIX. CRATÆGUS CHAMPLAINENSIS.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Cross section of a fruit, natural size.
6. Vertical section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.
9. The end of a vigorous shoot, natural size.



C.E. Faxon del.

Rapine sc.

CRATÆGUS CHAMPLAINENSIS, Sarg.

A. Riocreux direx.t

Imp. J. Taneur, Paris.

CRATÆGUS ANOMALA.

Haw.

STAMENS 10; anthers bright red. Leaves ovate, acutely lobed, membranaceous, yellow-green.

Cratægus anomala, Sargent, *Rhodora*, iii. 74 (1901).

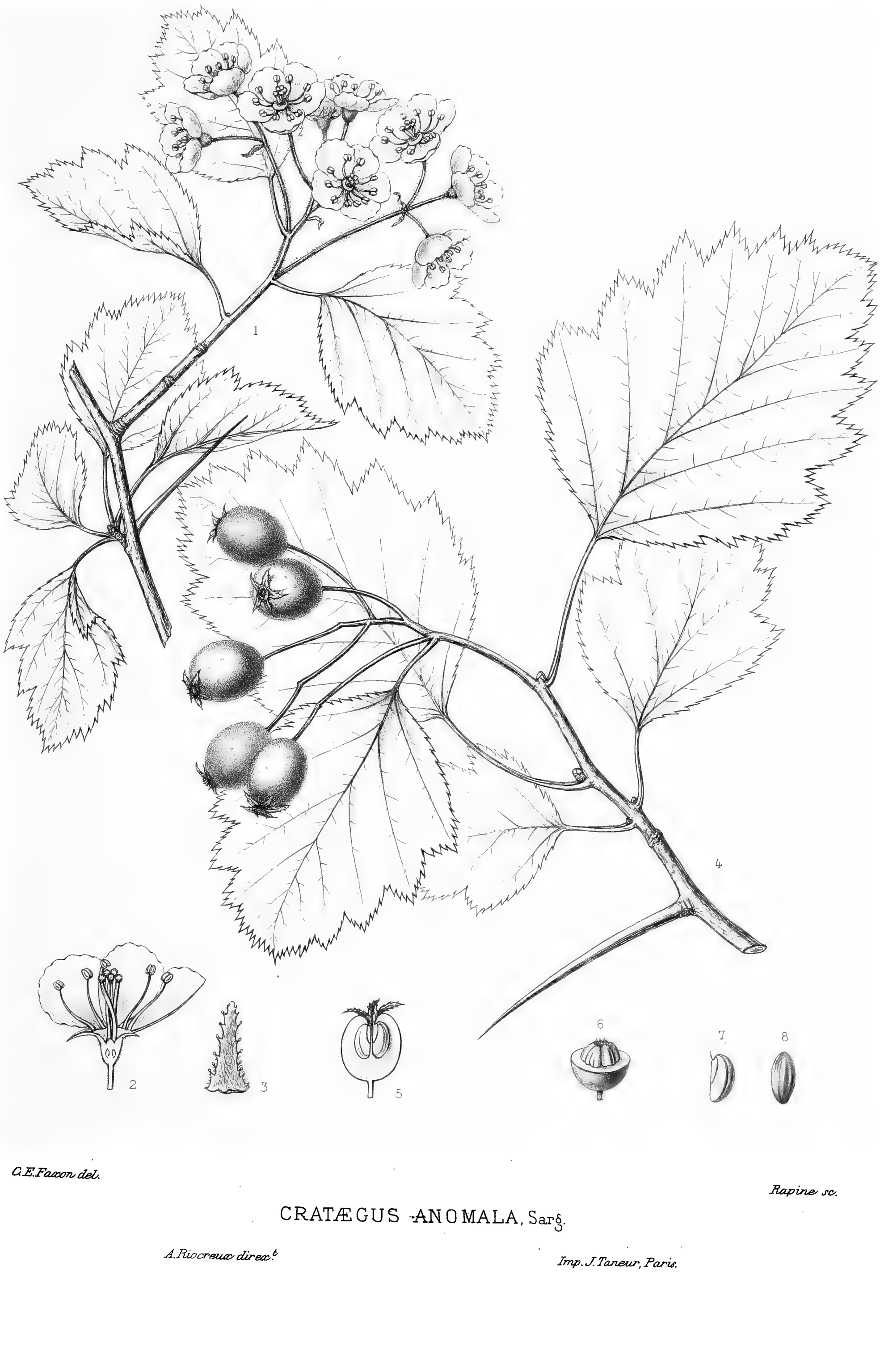
A bushy tree, sometimes twenty feet in height, with a short trunk six inches in diameter covered with pale gray-brown scaly bark, and stout ascending branches. The branchlets, which are slender and somewhat zigzag, are marked by pale lenticels and armed with numerous stout straight or slightly curved bright chestnut-brown spines from an inch and a quarter to two inches in length; when they first appear they are dark green and villose, with long matted white hairs, and during their first season they are puberulous and light orange-brown, becoming in their second year orange-brown or bright red. The leaves are ovate, acute, divided above the middle into five or six pairs of short acute or acuminate lobes, and coarsely doubly serrate, with spreading glandular teeth except toward the broadly cuneate or occasionally rounded base; as they unfold they are conspicuously plicate, scabrous above, with short appressed pale hairs, and villose below, particularly along the slender midribs and thin remote primary veins which arch to the points of the lobes and are only slightly impressed on the upper side; at maturity they are membranaceous, yellow-green, smooth and glabrous on the upper surface, paler and villose on the lower surface, from two and a half to three inches long and from two to three inches wide; they are borne on stout slightly grooved petioles glandular on the upper side, with scattered dark glands, and from three quarters of an inch to an inch in length. The stipules are linear-lanceolate or, on leading vigorous shoots, falcate and very oblique at the base, and often half an inch long. The flowers, which are half an inch in diameter and become distinctly saucer-shaped when fully expanded, open at the end of May, and are borne on elongated slender pedicels, in broad loose many-flowered thin-branched villose corymbs, with lanceolate or oblanceolate finely glandular-serrate bracts and bractlets. The calyx-tube is narrowly obconic and covered with a thick coat of long matted pale hairs, and the lobes are elongated, acuminate, coarsely glandular-serrate, pubescent on the lower surface, and tomentose on the upper surface. There are usually ten but occasionally seven or eight stamens with large bright red anthers, and four or five styles which are surrounded at the base by a narrow ring of pale tomentum. The fruit ripens in October and hangs on slender stems from one half to three quarters of an inch in length, in loose many-fruited slightly villose clusters; it is obovate to oblong, gradually narrowed to the rounded base, crimson, lustrous, marked by large pale scattered dots, and slightly villose, particularly toward the full and rounded apex, from three quarters to seven eighths of an inch long and from one half to five eighths of an inch wide; the calyx is large and prominent, with a broad shallow cavity, and elongated acuminate lobes which are abruptly narrowed from broad bases, dark red on the upper side, tomentose, finely glandular-serrate, spreading or closely appressed, and often deciduous before the ripening of the fruit; the flesh is thin, light yellow, and somewhat juicy. The four or five nutlets are thin, prominently and irregularly ridged on the back, and from one quarter to five sixteenths of an inch in length.

Cratægus anomala, of which only a few individuals are now known, inhabits the low limestone ridges near the banks of the St. Lawrence River in the Caughnawaga Indian Reservation opposite Lachine in the Province of Quebec. It was discovered in May, 1900, by Mr. J. G. Jack.

EXPLANATION OF THE PLATE.

PLATE DCLXX. CRATÆGUS ANOMALA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, natural size.
6. Cross section of a fruit showing the nutlets, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.



C.E. Faxon del.

Rapine sc.

CRATÆGUS ANOMALA, Sarg.

A. Riocreux direx.t

Imp. J. Taneur, Paris.

CRATÆGUS ELLWANGERIANA.

Scarlet Haw.

STAMENS 10; anthers rose color. Leaves oval, rounded or broadly cuneate at the base, membranaceous.

Cratægus Ellwangeriana, Sargent, *Bot. Gazette*, xxxiii. 118 (1902).

A tree, sometimes twenty feet in height, with a tall trunk often a foot in diameter covered with pale gray bark broken into small closely appressed scales, and divided into several ascending branches which form a broad symmetrical head; or frequently shrub-like, with numerous stems springing from a single root, and beginning to flower when only six or eight feet tall. The branchlets are slender, zigzag, marked by occasional small pale lenticels, and armed with stout straight or somewhat curved dark chestnut-brown shining spines from an inch and a half to two inches in length, or unarmed; when they first appear they are dark green and covered with long matted pale hairs, and during their first summer they are light chestnut-brown and slightly villose, becoming dark chestnut-brown and very lustrous in their second year, and ultimately ashy gray. The leaves are oval, acute at the apex, full and rounded or broadly cuneate at the base, irregularly divided, usually only above the middle, into numerous short acute lobes, and coarsely and often doubly serrate, with straight or incurved glandular teeth; about half grown when the flowers open the middle of May, they are then roughened above by short pale hairs, and villose below along the slender midribs and primary veins, and in the autumn they are membranaceous, light green and scabrous on the upper surface, pale and nearly glabrous on the lower surface, from two inches and a half to three inches and a half long and from two to three inches wide; they are borne on slender nearly terete petioles which, at first villose, are finally glabrous and vary from an inch and a half to two inches in length. The stipules are oblong-obovate, acute, villose, coarsely glandular-serrate, and half an inch long, those of upper leaves being mostly persistent until after the ripening of the fruit. The flowers are an inch in diameter, and are produced on short stout pedicels, in many-flowered densely villose corymbs, with lanceolate coarsely serrate caducous bracts and bractlets. The calyx-tube is broadly obconic and villose, and the lobes are elongated, lanceolate, glandular, with small pale stalked glands, villose on both surfaces, and generally reflexed after the flowers open. There are usually ten but sometimes eight stamens with small rose-colored anthers, and from three to five styles. The fruit, which ripens and falls from the middle to the end of September, is borne on slender glabrous pedicels from three quarters of an inch to an inch and a half in length, in drooping villose many-fruited crowded clusters; it is oblong, full, and rounded at the ends, bright crimson, very lustrous, covered, particularly near the ends, with scattered pale hairs, about an inch long and from one half to three quarters of an inch wide; the calyx-cavity is narrow and shallow, and the lobes are elongated, glandular-serrate above the middle, villose on the inner surface, and spreading, or erect and incurved; the flesh is thin, yellow, juicy, and acid. The nutlets, which vary from three to five in number and from one quarter to one third of an inch in length, are thick, pale brown, and deeply and often doubly and irregularly grooved on the back.

Cratægus Ellwangeriana is common in the neighborhood of Rochester, New York.

This handsome Thorn-tree, which is one of the largest and most beautiful in the northern states, was named for Mr. George Ellwanger,[1] the distinguished horticulturist, in whose nurseries at Rochester a

[1] George Ellwanger (December 2, 1816) was born in the picturesque village of Gross-Heppach in the valley of the Rems in Würtemburg, where he attended the village school until the age of fourteen, and from early childhood assisted his father, who was a

tree of this species, still standing, was large enough sixty years ago to be an object of interest and consideration.[1]

vineyardist and small farmer. Realizing that his native land, impoverished by the Napoleonic wars, offered to the rural population little opportunity for advancement, George Ellwanger, while still a boy, turned his thoughts to America, and having determined to emigrate to the United States, apprenticed himself for four years in the principal horticultural establishment in Stuttgart, in order to learn the nursery and florist business, paying a hundred guilders for the privilege of working without pay from sunrise to sunset.

In 1835 George Ellwanger landed in New York, and after a visit to relatives in Ohio settled in Rochester, which had attracted his attention on his journey westward over the Erie Canal. The following spring he became the manager of Reynolds & Bateham's nursery in that town, then the only commercial horticultural establishment in western New York, and in the spring of 1838, the proprietors having dissolved partnership, their nursery came into his possession. The following year Mr. Ellwanger purchased part of the land now occupied by the Mount Hope nurseries, and planted the best selected and most complete collection of fruit-trees which had been brought to this country. This standard and carefully named collection laid the foundation of the great usefulness and prosperity of the Mount Hope nurseries, which for more than sixty years have been an important factor in the development of horticultural and rural prosperity in the United States, and have made Rochester the chief horticultural centre in America.

In 1840 Mr. Ellwanger associated with himself Mr. Patrick Barry, and although in 1843 a disastrous fire destroyed nearly all their growing stock and the buildings of the nursery, the career of the firm has been one of great and sustained enterprise and success; and from the fruit-trees propagated at Mount Hope have sprung the orchards of the west and of Japan. The wealth which his industry, intelligence, and force of character has brought to Mr. Ellwanger has been liberally used for the benefit of the public. In 1890 the firm presented to the city of Rochester Highland Park, with its great pavilion dedicated for all time to the children of the city. In 1890 Mr. Ellwanger established and endowed in Rochester a home for aged Germans, and in 1893 he restored the old church in his native village. He is vice-president of the Reynolds Library Association of Rochester, and a trustee or director of many of the principal charitable and financial associations of that city, to whose prosperity and fame he has largely contributed.

[1] The tree in the Mount Hope nurseries at Rochester which first attracted my attention to this species was measured in July, 1901, by Mr. C. C. Laney, the superintendent of the Rochester Parks, who found it to be 23.4 feet high, with a spread of branches of 26.6 feet from north to south, and of 29 feet from east to west, and with a trunk circumference of 3.68 feet at the level of the ground, of 3.35 feet at 3 feet above the ground, and of 3.45 feet at 5.5 feet above the ground at the point where it begins to divide into three principal branches.

EXPLANATION OF THE PLATE.

PLATE DCLXXI. CRATÆGUS ELLWANGERIANA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. A fruit cut transversely, showing the nutlets.
6. A nutlet, side view, enlarged.
7. A winter branchlet, natural size.

C.E.Faxon del.

Rapine sc.

CRATÆGUS ELWANGERIANA, Sarg.

A.Riocreux direx.t

Imp. J.Taneur, Paris.

CRATÆGUS PRINGLEI.

Haw.

STAMENS usually 10; anthers dark purple. Leaves oval, acute, thin, bright yellow-green, drooping, and often convex.

Cratægus Pringlei, Sargent, *Rhodora*, iii. 21 (1901).

A tree, occasionally twenty-five feet in height, with a tall trunk ten or twelve inches in diameter covered with thin bark readily separating in large flakes broken into small loose dark red-brown scales, and stout branches which form a wide symmetrical head. The branchlets are of medium stoutness, slightly zigzag, marked by small pale lenticels, and armed with thick straight or somewhat curved chestnut-brown spines often an inch and a half in length; when they first appear they are dark green and villose, and soon becoming glabrous they are chestnut-brown and lustrous during their first summer, bright orange-brown during their second year, and ultimately ashy gray. The leaves are oval, acute at the apex, rounded or often abruptly narrowed and cuneate at the base, occasionally irregularly lobed above the middle, with short broad acute lobes, and coarsely and often doubly serrate, with glandular teeth; as they unfold they are villose on both surfaces and often more or less tinged with red, and when the flowers open, usually during the last week of May, they are roughened above by short closely appressed pale hairs and glabrous below with the exception of a few hairs on the slender midribs and remote primary veins; and at maturity they are thin, glabrous and bright yellow-green on the upper surface, pale on the lower surface, from two inches to two inches and a half long and from an inch and three quarters to two inches and a quarter wide; they are usually conspicuously concave by the gradual turning down of the blades from the midribs to the margins, and droop on thin slender glandular petioles which, villose at first, are ultimately glabrous, and from an inch to an inch and three quarters in length. The stipules are slightly falcate, conspicuously glandular-serrate, and caducous. On vigorous leading shoots the leaves are sometimes truncate or slightly cordate at the base, and frequently three inches long and broad. The flowers, which are about three quarters of an inch in diameter, are produced in many-flowered compound thin-branched villose corymbs, with linear acute straight or falcate bracts and bractlets. The calyx-tube is narrowly obconic and villose, particularly toward the base, and the lobes are narrow, acuminate, coarsely glandular-serrate, and villose on both surfaces or only on the inner surface, and generally reflexed after the flowers open. There are usually ten but occasionally from five to ten stamens with slender elongated filaments and small purple anthers, and from three to five styles surrounded at the base by conspicuous tufts of pale tomentum. The fruit, which ripens and falls late in September or early in October, is borne on stout pedicels often three quarters of an inch in length, in erect villose mostly few-fruited clusters; it is oblong, dark dull red marked by a few large dark dots, villose at the ends, with long scattered pale hairs, three quarters of an inch long and about five eighths of an inch thick; the calyx-cavity is deep and narrow, and the lobes are gradually narrowed from broad bases, acuminate, glandular-serrate, and often erect; the flesh is thick, yellow, dry, and acid, with a disagreeable flavor. The nutlets, which vary from three to five in number, are rounded and slightly ridged on the back, and a third of an inch in length.

Cratægus Pringlei is distributed from southern New Hampshire through the Champlain valley, where it is common on both sides of Lake Champlain as far north at least as Burlington, Vermont, to Rochester, New York, and Toronto, Canada, and through the southern peninsula of Michigan to Barrington, Illinois.

First collected in May, 1877, at Charlotte, Vermont, by Mr. C. G. Pringle,[1] it has been confounded with both *Cratægus tomentosa* and *Cratægus mollis* until its distinct characters were first pointed out in 1900 by Mr. Ezra Brainerd.[2]

[1] See ix. 129.

[2] Ezra Brainerd (December 17, 1844) was born at St. Albans, Vermont, where he passed his early life and was prepared for college. In the autumn of 1860 he entered Middlebury College, from which he was graduated in 1864 with the highest honors, and was appointed a tutor for the following year. After serving his college for two years as tutor Mr. Brainerd entered the Theological Seminary at Andover, Massachusetts, and in 1868 was appointed to the chair of rhetoric and English literature in Middlebury, a position which he filled until 1880, when he was made professor of physics and applied mathematics. Six years later he was elected the eighth president of his college. President Brainerd has devoted much study to natural sciences, and has contributed to the knowledge of the botany and geology of Vermont. During the last three years he has made a careful and thorough investigation of the numerous species of Cratægus in the upper Champlain valley, and has discovered several new and interesting forms, including the handsome shrub which connects his name with the flora of his native state.

EXPLANATION OF THE PLATE.

PLATE DCLXXII. CRATÆGUS PRINGLEI.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A fruiting branch, natural size.
4. Cross section of a fruit showing the nutlets, natural size.
5. Vertical section of a fruit, natural size.
6. A nutlet, side view, enlarged.
7. A nutlet, rear view, enlarged.

C.E. Faxon del.

Lartaud sc.

CRATÆGUS PRINGLEI, Sarg.

A. Riocreux dirext.

Imp. J. Taneur, Paris.

CRATÆGUS DILATATA.

Red Haw.

STAMENS 20; anthers rose color. Leaves broadly ovate, membranaceous, dark green.

Cratægus dilatata, Sargent, *Bot. Gazette*, xxxi. 9 (1901).

A tree, occasionally twenty feet in height, with a tall straight stem covered with light gray-brown bark broken into small thick plate-like scales, and spreading branches which form a wide round-topped symmetrical head; or often a tall broad shrub with many stout stems. The branchlets are slender, glabrous, slightly zigzag, marked by numerous large pale lenticels, and armed with few stout straight light chestnut-brown shining spines from one to two inches in length, or occasionally nearly spineless; when they first appear they are dark green more or less tinged with red, and during their first summer they become light chestnut-brown and very lustrous and ashy gray in their second year. The leaves are broadly ovate, acute, truncate, cordate or slightly rounded at the broad base, coarsely and except at the base generally doubly and irregularly serrate, with straight teeth tipped with large dark glands, and unequally lobed, usually with two or three pairs of acute or acuminate lateral lobes; when the flowers open at the end of May they are about a third grown and are then light yellow-green, conspicuously plicate, roughened on the upper surface by short stiff white hairs and glabrous on the lower surface, and in the autumn they are smooth and glabrous, dark green above, pale below, from two inches to two inches and a half long and almost as wide as they are long, with slender midribs and four or five pairs of thin primary veins only slightly impressed on the upper side; they are borne on slender grooved somewhat glandular petioles, at first villose but soon glabrous, often dark red toward the base after midsummer, and from one to two inches long. The stipules are linear-lanceolate, glandular, with dark red glands, and caducous. On vigorous leading shoots the leaves are often four or five inches long and frequently rather broader than they are long, and their stipules are foliaceous, lunate, and often half an inch in length. The flowers are from an inch to an inch and an eighth in diameter, and are produced on slender elongated pedicels, in broad loose many-flowered compound slightly villose corymbs, with lanceolate bracts and bractlets glandular, like the inner bud-scales, with dark red glands. The calyx-tube is broadly obconic, covered toward the base with matted pale hairs or nearly glabrous, and the lobes are broad, acuminate, coarsely glandular, with large stalked dark red glands, glabrous on the outer surface and generally slightly villose on the inner surface. There are twenty stamens with slender elongated filaments and large rose-colored anthers, and usually five styles surrounded at the base by small tufts of white hairs. The fruit, which ripens and falls early in September, hangs in many-fruited drooping clusters, and is subglobose, bright scarlet, lustrous, marked by numerous small dark dots, and about three quarters of an inch in diameter; the calyx is much enlarged, with a broad shallow cup and spreading coarsely serrate lobes bright red on the upper side of their broad bases; the flesh is thin, sweet, and yellow. The five nutlets are comparatively small for the size of the fruit, rounded and prominently ridged on the back, and about a quarter of an inch long.

Cratægus dilatata grows along the low borders of salt marshes and estuaries from Ipswich to Somerset, Massachusetts, on the shores of Mount Hope Bay in Tiverton, Rhode Island, on rich hillsides

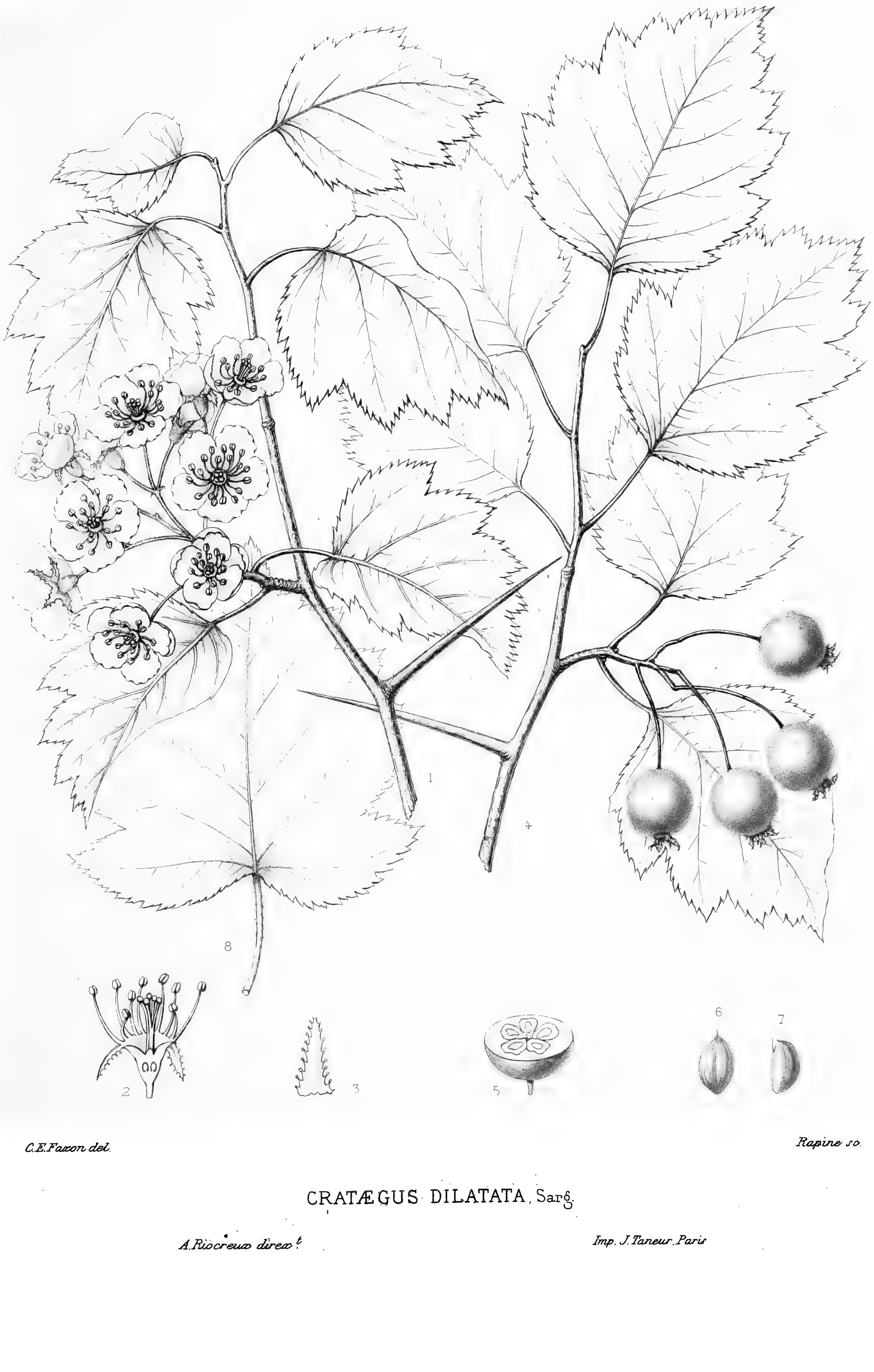
in the Champlain valley of southwestern Vermont, and probably ranges northward to the valley of the St. Lawrence River.[1]

[1] Specimens of what is probably this species have been collected by Mr. J. G. Jack at Caughnawaga on the southern bank of the St. Lawrence River opposite Lachine. The flesh of the fruit of the Canadian plant, which does not ripen and fall until the very end of September, is described, however, by Mr. Jack as pink and juicy. The flesh of the fruit of the earlier ripening Massachusetts plant appears to be always dry and yellow.

EXPLANATION OF THE PLATE.

PLATE DCLXXIII. CRATÆGUS DILATATA.

1. A flowering branch, natural size.
2. Vertical section of a flower, the petals removed, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Cross section of a fruit, enlarged.
6. A nutlet, rear view, enlarged.
7. A nutlet, side view, enlarged.
8. Leaf of a vigorous shoot, natural size.



C.E. Faxon del. Rapine sc.

CRATÆGUS DILATATA, Sarg.

A. Riocreux direx.t Imp. J. Taneur, Paris

CRATÆGUS COCCINIOIDES.

Red Haw.

STAMENS 20; anthers rose color. Leaves broadly ovate, acute, sharply lobed, thin, dull green.

Cratægus coccinioides, Ashe, *Jour. Elisha Mitchell Sci. Soc.* xvi. pt. ii. 74 (February, 1900).

Cratægus Eggertii, Britton, *Bull. N. Y. Bot. Gard.* i. 447 (in part) (March, 1900); *Man.* 520.

A tree, sometimes twenty feet in height, with a stem eight or ten inches in diameter covered with dark brown bark broken into small closely appressed scales, and stout spreading light gray branches forming a broad handsome head. The branchlets are stout, nearly straight, marked by small scattered pale lenticels, and armed with thick dark reddish purple shining spines which are rather remote from each other and from an inch and a half to two inches in length; when they first appear the branchlets are glabrous, dark green, and more or less tinged with red, becoming bright chestnut-brown and very lustrous before autumn, gray or reddish brown during their second year, and dull ashy gray during their third season. The leaves are broadly ovate, acute, full and rounded or truncate, and on vigorous shoots frequently more or less cordate, at the base, sharply and often doubly serrate, with straight glandular teeth, and divided above the middle into a number of short acute lobes; as they unfold they are conspicuously plicate, very lustrous, yellow-green, and villose on the lower side of the midribs, with a few short pale hairs which are usually persistent during the season; they soon lose their lustre, and at maturity the leaves are thin but firm in texture, rather rigid, dull dark green and smooth on the upper surface, pale on the lower surface, from two inches and a half to three inches long, and on vigorous shoots often three inches and a half long and broad, with thin pale yellow midribs deeply impressed above and often bright red toward the base after midsummer, and slender primary veins arching to the points of the lobes; they are borne on slender ridged petioles slightly grooved and glandular on the upper side, with minute stalked dark red glands, at first villose but soon glabrous, often bright red or pink toward the base, and from three quarters of an inch to an inch in length. The stipules are coarsely serrate, with gland-tipped teeth, and are lanceolate, and on leading shoots often lunate. Late in October the leaves turn gradually bright orange and scarlet. The flowers, which open early in May and are an inch and a quarter in diameter, are produced in very compact five to seven-flowered glabrous or slightly villose corymbs, with coarsely serrate oblong-obovate acute bracts and bractlets, conspicuous like the inner bud-scales from their large bright red glands. The calyx-tube is broadly obconic and the lobes are gradually narrowed from broad bases, acute, and coarsely glandular-serrate. There are twenty stamens with stout filaments and large rose-colored anthers, and five styles surrounded at the base by a ring of pale tomentum. The fruit, which ripens early in October and falls gradually during a month or six weeks, is borne on stout bright red pedicels about half an inch long, in few-fruited erect compact clusters; it is subglobose, much flattened at the ends, with a deep cavity at the insertion of the stalk, often obscurely five-angled, dark crimson, very lustrous, marked by numerous large pale dots, and about three quarters of an inch long and seven eighths of an inch broad; the calyx is much enlarged and conspicuous, with a broad deep cavity and spreading or erect lobes bright red on the upper side near the base; the flesh is thick, firm, subacid, and more or less deeply tinged with red. The five nutlets, which are small in comparison with the size of the fruit, are light-colored and are rounded and slightly ridged on the back, and about one third of an inch in length.

Cratægus coccinioides inhabits rather dry woods, and is distributed from the neighborhood of St.

Louis to eastern Kansas.[1] It appears to have been first noticed in October, 1882, at Allenton, Missouri, by Mr. George W. Letterman, by whom the following year seeds were sent to the Arnold Arboretum, where this interesting tree has grown to a large size and flowers and fruits profusely every year.[2]

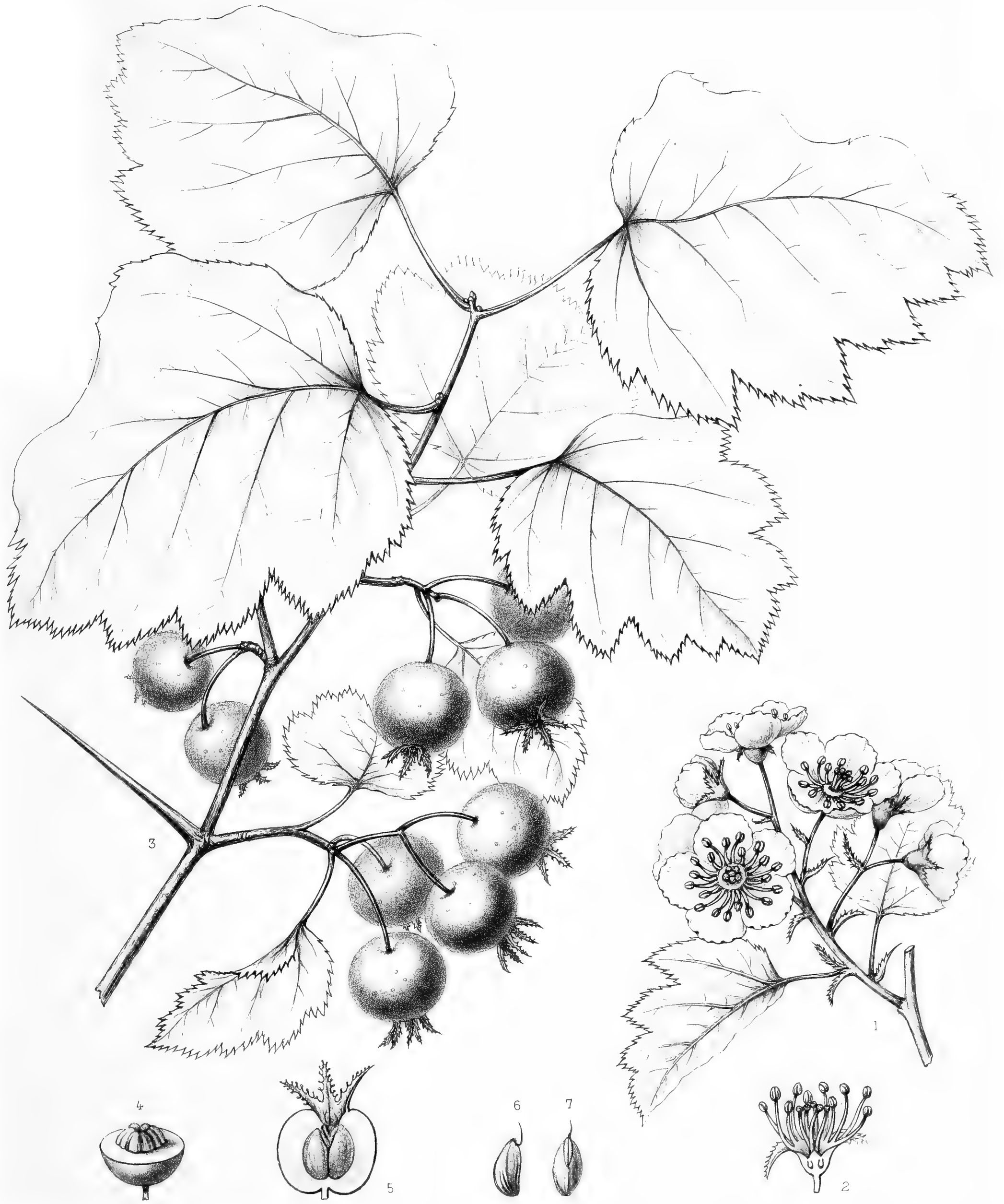
[1] In April and October, 1895, *Cratægus coccinioides* was collected by Mr. J. B. S. Norton in Riley County, Kansas (No. 146).

[2] In spite of its large and very beautiful individual flowers and fruits and handsome foliage, *Cratægus coccinioides* is not one of the showiest of the American Thorns, as the flowers and fruits are produced in such compact clusters that they are often nearly hidden by the large leaves. It is beautiful, however, in the autumn when the foliage is turning, and the brilliancy of the bright orange and scarlet leaves at the ends of the leading branches is heightened by contrast with the dark green leaves with their red petioles on the lateral branchlets.

EXPLANATION OF THE PLATE.

PLATE DCLXXIV. CRATÆGUS COCCINIOIDES.

1. A flowering branch, natural size.
2. Vertical section of a flower, the petals removed, enlarged.
3. A fruiting branch, natural size.
4. Cross section of a fruit showing the nutlets, natural size.
5. Vertical section of a fruit, natural size.
6. A nutlet, side view, enlarged.
7. A nutlet, front view, enlarged.



C.E.Faxon del.

Rapine sc.

CRATÆGUS COCCINIOIDES, Ashe

A.Riocreux direx.t

Imp. J.Taneur, Paris.

CRATÆGUS LOBULATA.

Red Haw.

STAMENS usually 10; anthers dark red-purple. Leaves ovate to oblong-ovate, acutely lobed, membranaceous, dark yellow-green.

Cratægus lobulata, Sargent, *Rhodora*, iii. 22 (1901).

A tree, occasionally thirty-five feet in height, with a straight trunk often a foot in diameter covered with dark red-brown fissured bark broken into small thick plate-like scales, and stout generally ascending light gray-brown branches forming an open usually narrow irregular head. The branchlets are thin, slightly zigzag, marked by many small pale lenticels, and armed with numerous stout nearly straight chestnut-brown spines rarely more than an inch in length; dark green and coated with matted pale hairs when they first appear, they become bright chestnut-brown and very lustrous during their first season, and light orange-brown in their second year. The leaves vary from oval to oblong-ovate, and are acute at the apex, broadly cuneate or rounded at the entire base, sharply and often doubly serrate above, with straight glandular teeth, and deeply divided into numerous narrow acute or acuminate lobes, with tips which are spreading or point to the apex or to the base of the leaf; when they first appear and until after the opening of the flowers during the last week in May, when they are about half grown, the leaves are covered above with short soft pale hairs and are slightly pubescent below along the slender midribs and thin primary veins arching to the points of the lobes, and at maturity they are thin, dark yellow-green and glabrous on the upper surface, paler on the lower surface, with occasional short white hairs toward the base of the midribs, from two inches and a half to three inches and a half in length and from two inches to two inches and a half in width; they are borne on slender nearly terete slightly grooved petioles tomentose at first, particularly toward the base, and at maturity pubescent or nearly glabrous, bright red, and from an inch to an inch and a half in length. The stipules are linear, acuminate, bright red before fading, and caducous. The flowers are three quarters of an inch in diameter on elongated slender pedicels, in rather compact many-flowered thin-branched tomentose compound corymbs, with linear-lanceolate glandular-serrate bright red bracts and bractlets. The calyx-tube is broadly obconic, glabrous or villose toward the base, and dark red, and the lobes are gradually narrowed from broad bases, acute, glabrous, and coarsely glandular-serrate, with large dark red stipitate glands. There are usually ten but occasionally from five to ten stamens with slender elongated filaments and small dark reddish purple anthers, and from three to five styles sometimes surrounded at the base by a ring of pale tomentum. The fruit, which ripens and falls early in October, is borne in erect compact slightly tomentose clusters, on short stout pedicels; it is oblong, somewhat flattened at the full and rounded ends, bright crimson, very lustrous, marked by occasional small white dots, and about three quarters of an inch long and five eighths of an inch thick; the calyx-cavity is deep and narrow, and the lobes are small, lanceolate, coarsely glandular-serrate, tomentose on the upper surface, erect and incurved, and persistent; the flesh is thick, yellow, sweet, and juicy. The nutlets vary from three to five in number, and are thin, dark-colored, ridged and often grooved on the back, and a quarter of an inch long.

Cratægus lobulata inhabits the Champlain valley, where it is not rare, from Middlebury, Vermont, and Crown Point, New York, as far north at least as Burlington, Vermont, and ranges southward through western Massachusetts to northern Connecticut.[1] It is one of the largest of the

[1] *Cratægus lobulata* was collected on August 29, 1901, by Mr. C. H. Bissell on Shelden's Cove near Lyme.

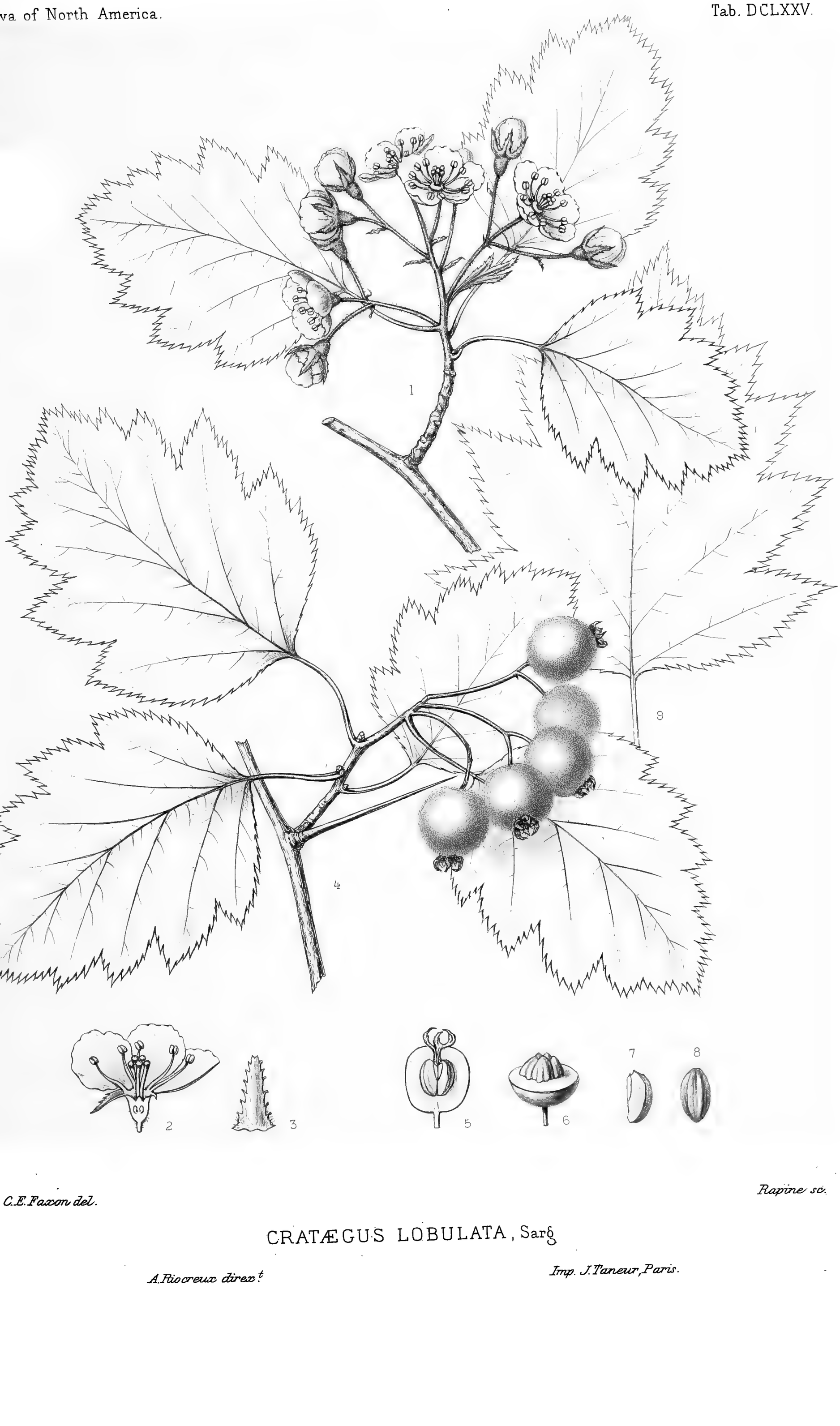
Thorns of the northern states, and in the autumn, when it is covered with its large and abundant fruits, it is not surpassed in beauty by many other species of the genus.

Cratægus lobulata appears to have been first collected in September, 1899, by Mr. Ezra Brainerd at Crown Point, where a number of trees of this species have grown to a large size on the slopes and in the ditch of the abandoned fort, which is now nearly covered with great thickets of Cratægus of several species.

EXPLANATION OF THE PLATE.

PLATE DCLXXV. CRATÆGUS LOBULATA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, natural size.
6. Cross section of a fruit showing the nutlets, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.
9. A leaf of a vigorous shoot, natural size.



C.E. Faxon del.

Rapine sc.

CRATÆGUS LOBULATA, Sarg.

A. Riocreux direx.t

Imp. J. Taneur, Paris.

CRATÆGUS HOLMESIANA.

Red Haw.

STAMENS usually 5; anthers dark reddish purple. Leaves oval or ovate, acute, thick and firm, pale yellow green.

Cratægus Holmesiana, Ashe, *Jour. Elisha Mitchell Sci. Soc.* xvi. pt. ii. 78 (1900). — Sargent, *Bot. Gazette*, xxxi. 10; *Rhodora*, iii. 76.

A tree, often thirty feet in height, with a tall straight trunk from ten to fifteen inches in diameter covered with pale gray-brown or nearly white bark broken into small thin closely appressed scales, and stout ascending branches forming an open irregular or a broad compact head. The branchlets are stout, nearly straight or sometimes zigzag, marked by small oblong dark lenticels, and armed with infrequent thick mostly straight bright chestnut-brown shining spines from an inch and a half to two inches in length; when they first appear they are glabrous or rarely puberulous [1] and dark green more or less tinged with red; and during their first season they become bright chestnut-brown or orange-brown and lustrous, lighter colored during their second season, and ultimately ashy gray. The leaves are oval or ovate, acute or acuminate at the apex, rounded or broadly cuneate at the base, coarsely and, above the middle, doubly serrate, with spreading teeth tipped at first, with prominent dark red caducous glands, and usually lobed with three or four pairs of short acute or acuminate lateral lobes; generally dark red and glabrous or sometimes villose on the lower surface and coated with rigid pale hairs on the upper surface when they unfold, they are scabrous above, pale yellow-green and nearly half grown when the flowers open early in May, and in the autumn they are thick and firm in texture, almost smooth, conspicuously yellow-green, and usually about two inches long and an inch and three quarters wide, with prominent midribs often bright red on the lower side toward the base of the leaf, and from four to six pairs of slender primary veins arching to the points of the lobes and deeply impressed on the upper side; they are borne on slender nearly terete slightly grooved glandular petioles which are glabrous or sometimes puberulous while young, and from an inch to an inch and a half in length. The stipules are linear or lunate and are small, glandular-serrate, and caducous. On vigorous leading shoots the leaves are often broadly ovate, truncate or slightly cordate at the base, frequently four inches long and three inches wide, and more coarsely serrate and more deeply lobed than the leaves of lateral branchlets. The flowers are cup-shaped and from one half to three quarters of an inch in diameter, and are produced on slender elongated pedicels, in loose compound glabrous or rarely puberulous many-flowered corymbs, with oblanceolate or linear acute glandular caducous bracts and bractlets. The calyx-tube is narrowly obconic, glabrous, more or less deeply tinged with red, and the lobes are elongated, acuminate, glandular-serrate or often nearly entire, and generally reflexed after the flowers open. There are usually five but sometimes six, seven, or eight stamens with stout filaments and large dark reddish purple anthers, and generally three styles surrounded at the base by a narrow ring of pale tomentum. The fruit ripens and falls early in September, and hangs gracefully on slender pedicels, in many-fruited drooping clusters; it is oblong, full and rounded at the ends, crimson, very lustrous, marked by occasional small dark dots, and crowned with the conspicuous erect and incurved glandular-serrate

[1] *Cratægus Holmesiana* is usually glabrous with the exception of the upper surface of the young leaves, but on the trees which grow in meadows at Sellersville, Pennsylvania, the young branchlets, petioles, and corymbs are often puberulous, and the under surfaces of the leaves are more or less villose, particularly along the midribs and veins (*Cratægus Holmesiana villipes*, Ashe, *Jour. Elisha Mitchell Sci. Soc.* xvii. pt. ii. 11 [1901]). A few hairs can occasionally be found on the corymbs of New England plants, although they are generally glabrous.

calyx-lobes, which are bright red toward the base on the upper side; the flesh is thin, yellow, dry, and mealy, with a disagreeable flavor. The nutlets are usually three in number and are light chestnut-brown, prominently grooved and ridged on the back, with broad rounded ridges, and about a quarter of an inch long.

Cratægus Holmesiana grows on rich moist hillsides and the borders of streams and swamps, and is easily distinguished by its pale bark and the distinctly yellow color of the leaves, and in eastern New England by its large size. It is distributed from the neighborhood of Montreal and from southern Ontario to the coast of Maine, central and western Massachusetts, western New York, Rhode Island, and eastern Pennsylvania, being perhaps most abundant and attaining its largest size on the hills of Worcester County, Massachusetts.[1]

This handsome tree was named for Joseph Austin Holmes,[2] director of the Geological Survey of North Carolina.

[1] *Cratægus Holmesiana* is one of the species which has been long confounded with *Cratægus coccinea* of Linnæus. The oldest specimen which I have seen is one in the Gray Herbarium, without date or name of collector, from northern New York. A specimen collected at Haverhill, New Hampshire, by Mr. Edwin Faxon in June, 1885, led to the investigation of this tree in New England, and its subsequent discovery in other parts of the country.

[2] Joseph Austin Holmes (November 28, 1859) was born in Laurens, South Carolina, where he received his early education. He was graduated from Cornell University in 1881, and was at once appointed professor of geology and natural history in the University of North Carolina. From this position he retired in 1891 to become director of the geological survey of that state, a position which he still fills.

EXPLANATION OF THE PLATE.

PLATE DCLXXVI. CRATÆGUS HOLMESIANA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Cross section of a fruit showing the nutlets, natural size.
6. Vertical section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.

C.E. Faxon del. Lartaud sc.

CRATÆGUS HOLMESIANA, Ashe.

A. Riocreux direx.t Imp. J. Taneur, Paris.

CRATÆGUS PEDICELLATA.

Haw.

STAMENS usually 10; anthers rose color. Leaves broadly ovate or oval, dark green, and scabrous above.

Cratægus pedicellata, Sargent, *Bot. Gazette*, xxxi. 226 (1901).

A tree, eighteen or twenty feet in height, with a tall trunk sometimes a foot in diameter covered with close red-brown scaly bark, and comparatively slender elongated ascending or spreading branches which form a broad handsome symmetrical head. The branchlets are thin, somewhat zigzag, marked by numerous small pale lenticels, and armed with straight or slightly curved shining chestnut-brown spines from an inch and a half to two inches in length; when they first appear they are dark chestnut-brown and slightly villose, and during their first season become very lustrous, and ashy gray in their second year. The winter-buds are nearly globose, bright red, and an eighth of an inch in diameter. The leaves are broadly ovate or occasionally obovate or rhomboidal, acute or acuminate, broadly cuneate or rounded, and on vigorous leading shoots sometimes truncate or slightly cordate at the base, divided above the middle into four or five pairs of short acute or acuminate lobes and coarsely and often doubly serrate, except toward the base, with spreading glandular teeth; in early spring they are roughened above by short rigid pale hairs and are glabrous below, and at maturity they are membranaceous, dark rich green and scabrous on the upper surface and pale on the lower surface, from three to four inches long and from two to three inches wide, with slender midribs only slightly impressed above and thin remote primary veins arching to the points of the lobes; they are borne on slender slightly grooved nearly terete petioles which are glandular, with obscure scattered minute dark glands, at first villose, ultimately glabrous, and from an inch and a half to two inches and a half in length. The stipules on vigorous shoots are strongly falcate, stipitate, coarsely glandular-serrate, and one third of an inch long. The flowers, which open during the last week in May when the leaves are nearly two thirds grown, are half an inch in diameter and are borne on thin pedicels, in loose lax many-flowered slender-branched slightly villose corymbs, with lanceolate glandular caducous bracts and bractlets. The calyx-tube is narrowly obconic and glabrous, and the lobes are broad, acute, very coarsely glandular-serrate, and reflexed after the flowers open. There are usually ten stamens with elongated filaments and rose-colored anthers, and five styles surrounded at the base by a conspicuous ring of pale tomentum. The fruit, which mostly falls before the end of September, hangs in few-fruited drooping glabrous clusters, on slender pedicels generally about three quarters of an inch in length; pyriform until nearly fully grown, it is oblong when ripe, full and rounded at the ends, bright scarlet, lustrous, marked by numerous small dark dots, three quarters of an inch long, and from one half to five eighths of an inch thick; the calyx-cavity is broad and deep and the lobes are much enlarged, coarsely serrate, and usually erect and incurved; the flesh is pale, thin, dry, and mealy. The five nutlets are rounded and deeply grooved on the back and about one third of an inch in length.

Cratægus pedicellata is not rare in the neighborhood of Rochester, New York, where it was first distinguished in 1899 by Mr. John Dunbar.[1]

[1] John Dunbar (June 4, 1859) was born in the parish of Rafford, Elginshire, Scotland, and was bred a gardener first in the gardens of Sir William Gordon Cumming at Altyre in his native parish, which he entered when he was seventeen years old, and then on several large estates in England. Coming to the United States in 1887, he found employment in the garden of Mr. Charles A. Dana at Dosoris on Long Island, where he had an excellent opportunity to become familiar with the trees and shrubs which grow

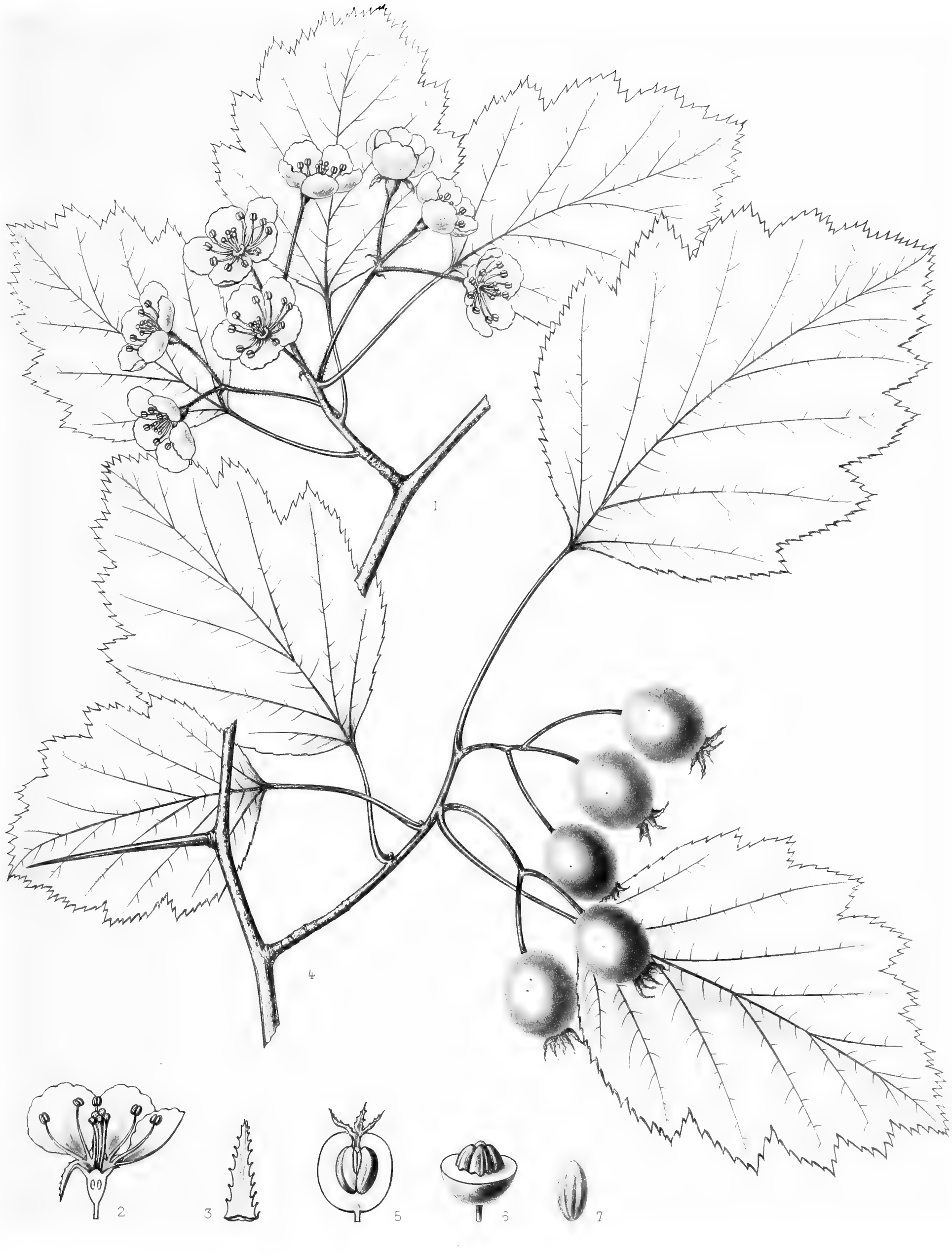
in the north Atlantic states. This knowledge he has turned to good account in Rochester, where he is now assistant superintendent of the city parks, and has charge of the Pinetum and the large shrub collection in Highland Park.

During the last three years Mr. Dunbar has carefully studied the numerous species of Cratægus which abound near Rochester in the valley of the Genesee River, where he has first distinguished a number of interesting forms.

EXPLANATION OF THE PLATE.

PLATE DCLXXVII. CRATÆGUS PEDICELLATA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, enlarged.
6. Cross section of a fruit showing the nutlets, natural size.
7. A nutlet, enlarged.



2 3 5 6 7

C.E. Faxon del.

Lartaud sc.

CRATÆGUS PEDICELLATA, Sarg.

A. Riocreux direx.t

Imp. J. Taneur, Paris.

CRATÆGUS SCABRIDA.

Haw.

STAMENS usually 10; anthers dark red-purple. Leaves oval to oblong-obovate, acuminate, thick and firm, dark green and scabrous above.

Cratægus scabrida, Sargent, *Rhodora*, iii. 29; 76 (1901).

A tree, from fifteen to twenty feet in height, with a short trunk six or eight inches in diameter covered with lustrous pale gray-brown bark broken into large thin plate-like scales, and horizontal branches which form a broad round-topped head; or often shrubby, with numerous small stems. The branchlets are stout, somewhat zigzag, glabrous, marked by oblong pale lenticels, and armed with slender straight or slightly curved light chestnut-brown spines from an inch and a half to two inches in length; dark orange-green when they first appear, they become dark chestnut-brown or orange-brown and lustrous before midsummer, and mostly ashy gray during their second year. The leaves vary from oval to oblong-obovate, and are acuminate, gradually narrowed from near the middle to the cuneate entire base, irregularly and often doubly glandular serrate above, and usually divided, generally only above the middle, into several short acute or acuminate lobes; glabrous below and coated above with short soft pale hairs when the flowers open at the end of May, when they are about half grown, the leaves are thick and firm in texture at maturity, dark green and scabrous on the upper surface, pale yellow-green on the lower surface, from two to three inches long and from an inch and a half to two inches wide, with slender midribs deeply impressed above and often more or less tinged with red below, particularly on vigorous shoots, and four or five pairs of thin prominent primary veins running to the points of the lobes; they are borne on slender grooved petioles which are sometimes glandular, often slightly winged toward the apex, glabrous or occasionally villose, and from one half to three quarters of an inch in length. The stipules are linear, acuminate, and caducous. The flowers are three quarters of an inch in diameter, and are produced on slender elongated pedicels, in loose broad many-flowered thin-branched glabrous or somewhat villose corymbs, with linear acute glandular-serrate bracts and bractlets. The calyx-tube is narrowly obconic and glabrous, and the lobes are linear-lanceolate, acuminate, finely glandular-serrate, and reflexed and bright red at the tips after the flowers open. There are usually ten or rarely from five to ten stamens with slender filaments and small dark red-purple anthers, and two or three styles surrounded at the base by a thick ring of pale tomentum. The fruit hangs in loose drooping many-fruited clusters, on long thin pedicels, and ripens and mostly falls from the middle to the end of September; it is subglobose or short-oblong, full and rounded at the ends, and is usually about an inch long; the calyx-cavity is broad and shallow, and generally only the bases of the elongated reflexed lobes are found on the ripe fruit; the flesh is thick, dry, and mealy. The two or three nutlets are thick, rounded and prominently ridged on the back, and a third of an inch in length.

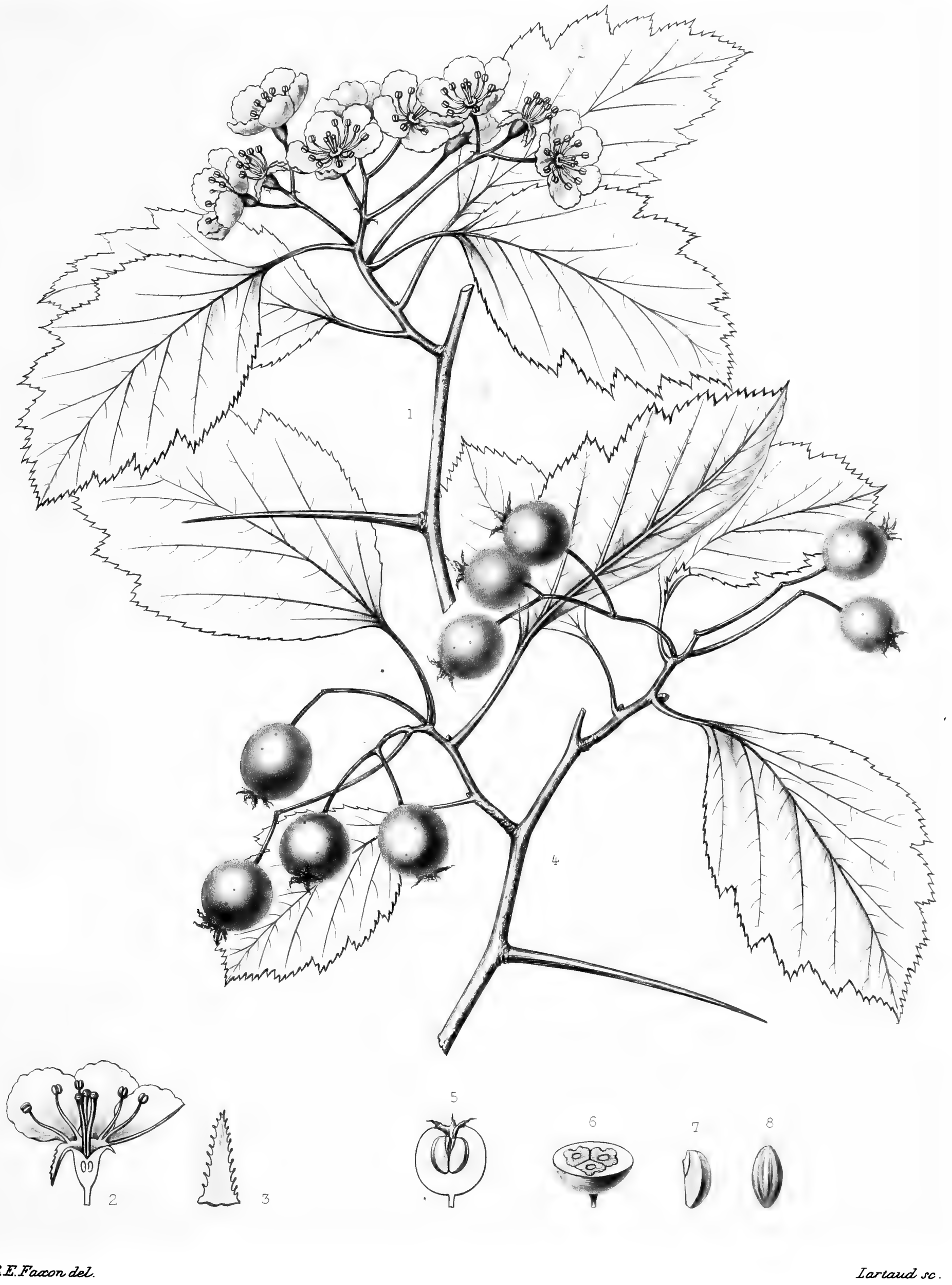
Cratægus scabrida inhabits limestone ridges and is distributed from the neighborhood of Montreal[1] to southwestern Vermont and southwestern New Hampshire. Of the specimens of this species which I have seen the first was collected by Mr. J. G. Jack in August, 1899, at the village of Caughnawaga in the Province of Quebec.

[1] The specimens collected by Mr. Jack at several points opposite Lachine on the St. Lawrence are slightly pubescent on the young petioles and corymbs, but do not otherwise appear to differ from the Vermont and New Hampshire trees.

EXPLANATION OF THE PLATE.

PLATE DCLXXVIII. CRATÆGUS SCABRIDA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, natural size.
6. Cross section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.



C.E. Faxon del.

Tartaud sc.

CRATÆGUS SCABRIDA, Sarg.

A. Riocreux direx.t

Imp. J. Taneur, Paris

CRATÆGUS LUCORUM.

Red Haw.

STAMENS 20; anthers dark purple. Leaves broadly ovate to oval, membranaceous, dull dark green.

Cratægus lucorum, Sargent, *Bot. Gazette*, xxxi. 227 (1901).

A tree, from twenty to twenty-five feet in height, with a tall straight stem six or eight inches in diameter covered with close dark red-brown bark, and slender ascending branches forming a narrow open head. The branchlets are thin, zigzag, marked by many oblong pale lenticels, and occasionally armed with straight or slightly curved bright red-brown lustrous spines from an inch to an inch and a half in length; dark green and somewhat villose when they first appear, they become dull orange-brown in their first summer, and ultimately dark gray-brown. The leaves vary from broad-ovate to obovate or rarely to oval, and are acute or acuminate at the apex, gradually narrowed and broadly cuneate or full and rounded at the entire base, coarsely serrate above, with straight teeth tipped with large persistent bright red finally dark glands, and deeply divided above the middle into three or four pairs of wide acute or acuminate lobes; in early May when the flowers open they are more than one third grown and are then light yellow-bronze color, covered on the upper surface with short soft pale hairs and glabrous on the lower surface, and in the autumn they are membranaceous, smooth, dark dull green and glabrous above, pale yellow-green below, about two inches long and an inch and a quarter wide, with slender yellow midribs only slightly impressed on the upper side and three or four pairs of thin primary veins extending obliquely to the points of the lobes; they are borne on slender glandular petioles often somewhat winged toward the apex and from an inch to an inch and a half in length. The stipules vary from linear-lanceolate to oblanceolate and are glandular-serrate, from one quarter to one half of an inch in length, and caducous. On leading vigorous shoots the leaves are usually ovate and rounded at the broad base, more deeply lobed than the leaves of fertile branchlets, and sometimes three inches long and broad. The flowers are three quarters of an inch in diameter and are produced on thin pedicels, in narrow compact few-flowered thin-branched small villose corymbs, with narrow acuminate finely glandular-serrate caducous bracts and bractlets. The calyx-tube is broadly obconic and glabrous, and the lobes are narrow, acuminate, coarsely glandular-serrate, villose on the upper surface, and reflexed after the flowers open. There are twenty stamens with slender filaments and small dark purple anthers, and four or five styles. The fruit, which ripens about the middle of September and soon falls, is borne in erect few-fruited slightly villose clusters, on short stout pedicels; it is pear-shaped until nearly fully grown, and at maturity it is oblong or somewhat obovate, full and rounded at the ends, crimson, lustrous, marked by small pale dots, and from one half to five eighths of an inch in length; the calyx-cavity is deep but narrow and the lobes are elongated, coarsely glandular-serrate, villose above, spreading and closely appressed, and often deciduous before the fruit ripens; the flesh is thick, yellow, dry, and mealy. The four or five nutlets are thin, rounded and sometimes obscurely ridged on the back, and about a quarter of an inch long.

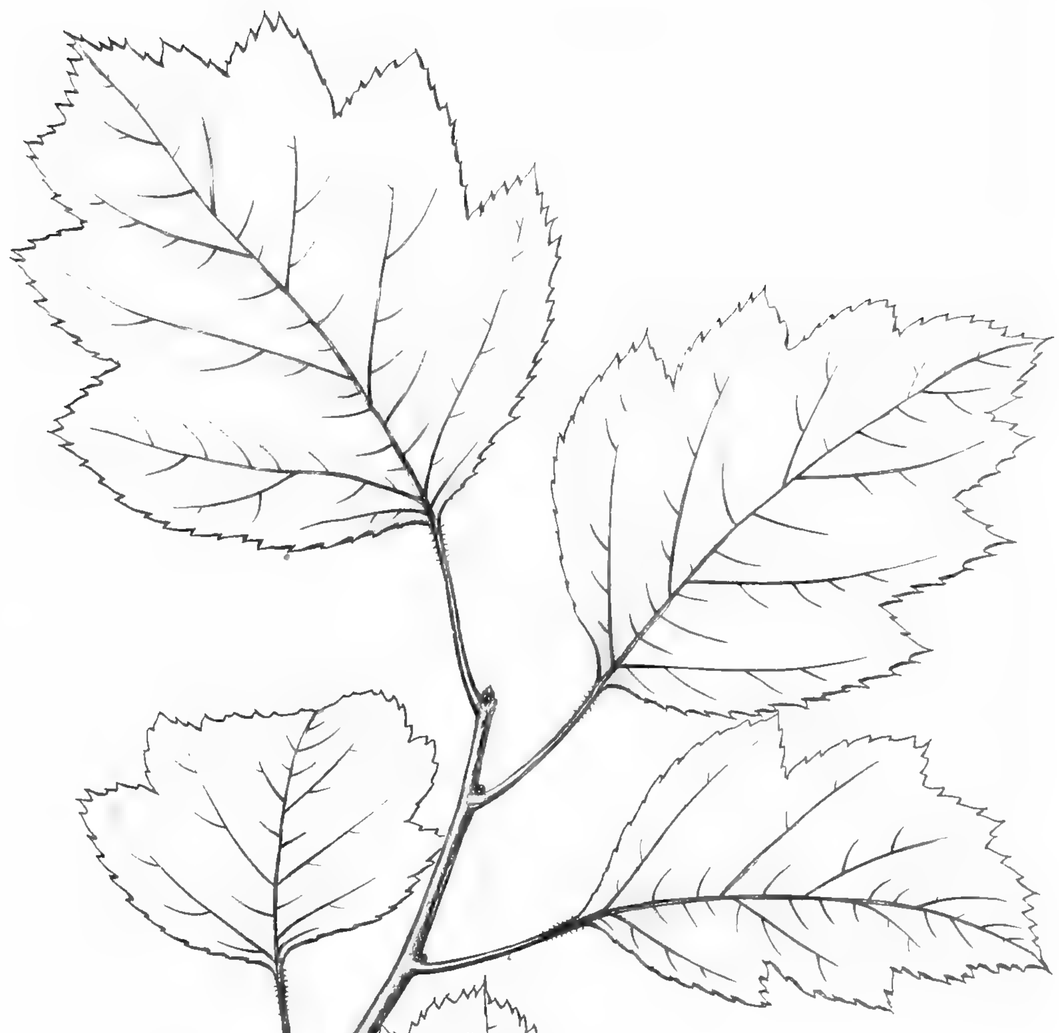
Cratægus lucorum grows in rich moist soil along the margins of Oak groves on the banks of sloughs near Barrington, Illinois, and was probably first collected in May, 1899, by Mr. E. J. Hill.

EXPLANATION OF THE PLATE.

PLATE DCLXXIX. CRATÆGUS LUCORUM.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Cross section of a fruit, natural size.
6. A nutlet, rear view, enlarged.
7. A nutlet, side view, enlarged.

1



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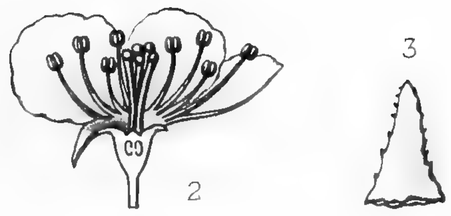
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6 7

C.E. Faxon del.

Lartaud sc.

CRATÆGUS LUCORUM, Sarg.

A. Riocreux dirext.

Imp. J. Taneur, Paris.

CRATÆGUS LACERA.

Haw.

STAMENS 20; anthers rose color. Leaves rhombic to broadly ovate.

Cratægus lacera, Sargent, *Bot. Gazette*, xxxiii. 123 (1902).

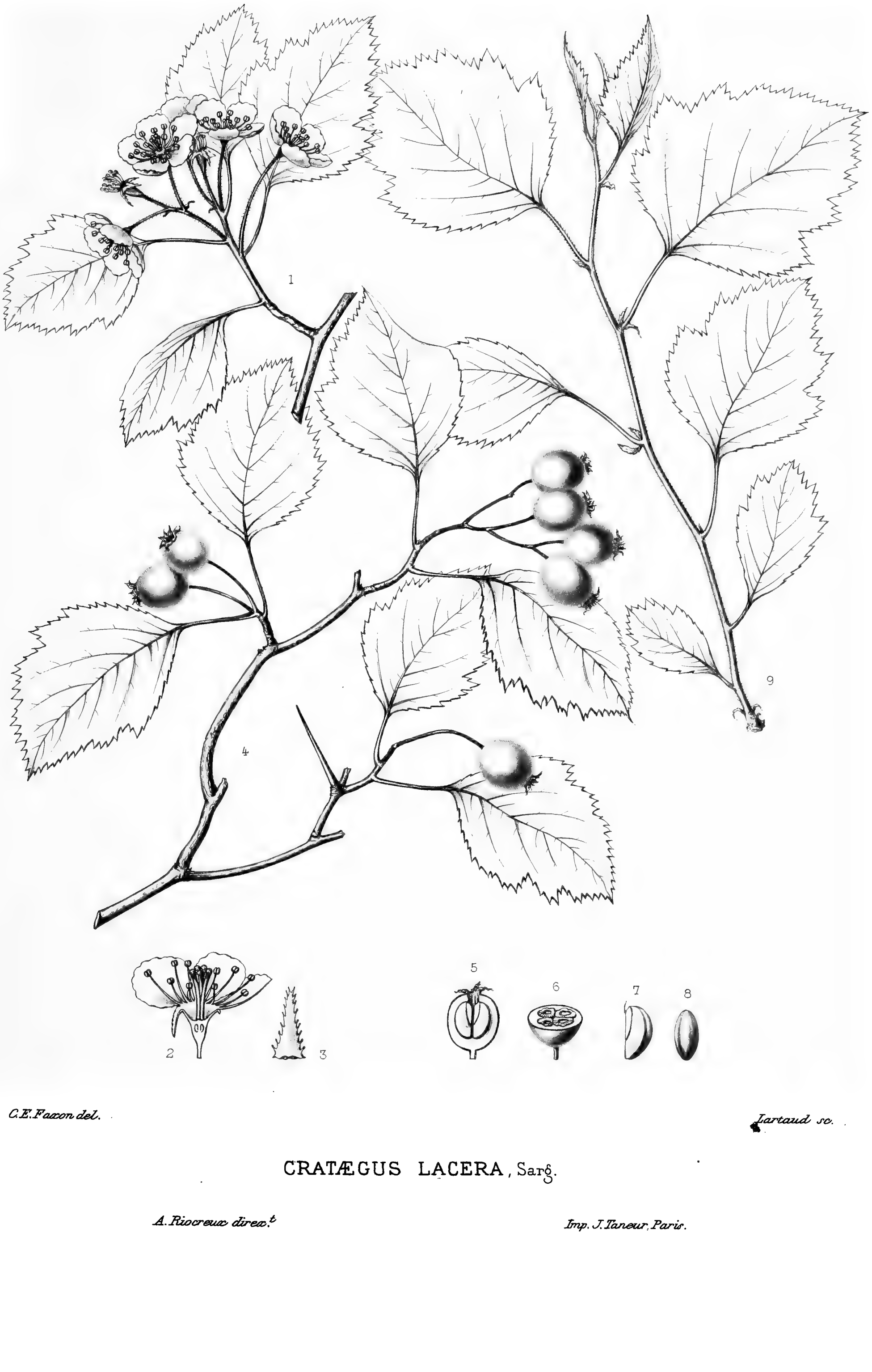
A slender tree, from twenty-five to thirty feet in height, with a tall trunk only four or five inches in diameter covered with pale gray-brown scaly bark, and small short branches forming a narrow head. The branchlets are slender, slightly zigzag, marked by small oblong pale lenticels, and armed with thin straight bright chestnut-brown lustrous spines from three quarters of an inch to an inch and three quarters in length; when they first appear they are dark olive-green and villose, becoming light red-brown and glabrous during their first summer, and ultimately dull light gray. The leaves vary from rhombic to broadly ovate or rarely to obovate, and are acute at the apex, broadly cuneate and entire at the base, divided above the middle into numerous acute lobes, and coarsely and often doubly serrate, with straight glandular teeth; coated below with thick hoary tomentum and villose above when they unfold, they are nearly fully grown when the flowers open about the twentieth of April, and are then glabrous on the lower surface and covered on the upper surface with short scattered pale hairs; and at maturity they are glabrous, light yellow-green, paler below than above, thin but firm in texture, about an inch and a half long and an inch and a quarter wide, with thin yellow midribs and few remote primary veins only slightly impressed on the upper side; they are borne on slender grooved villose ultimately glabrous or puberulous petioles slightly winged at the apex, often red toward the base, and from one quarter to one third of an inch in length. The stipules are linear, acuminate, villose, and caducous. On vigorous leading shoots the leaves are broadly ovate, often deeply three-lobed, very coarsely serrate, and from three to four inches long and broad, with lunate long-pointed coarsely glandular-serrate villose stipules sometimes a quarter of an inch in length. The flowers are three quarters of an inch in diameter, and are produced in somewhat villose many-flowered compound corymbs, with linear caducous bracts and bractlets. The calyx-tube is narrowly obconic and glabrous, and the lobes are linear lanceolate, elongated, coarsely glandular-serrate, glabrous on the outer surface, villose on the inner surface, and reflexed after the flowers open. There are twenty stamens with small rose-colored anthers, and four or five styles. The fruit, which ripens toward the end of October, is borne on short stout glabrous pedicels, in erect few-fruited clusters; it is oblong, full and rounded at the ends, bright cherry-red, lustrous, marked by occasional large dark dots, and half an inch long; the calyx-cavity is broad and shallow, and the lobes are small, nearly triangular, villose above, spreading, and mostly deciduous before the fruit ripens; the flesh is thick and orange color. The nutlets, which vary from three to five in number, are thin, broad, only slightly ridged on the rounded back, light brown, and five sixteenths of an inch in length.

Cratægus lacera inhabits the low rich glades between the rolling hills which rise above the bottoms of the Red River near Fulton, Arkansas, where I first found this handsome and distinct tree on the second of October, 1900.

EXPLANATION OF THE PLATE.

PLATE DCLXXX. CRATÆGUS LACERA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, natural size.
6. Cross section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.
9. The end of a vigorous shoot, natural size.



C.E. Faxon del. Tartaud sc.

CRATÆGUS LACERA, Sarg.

A. Riocreux direx.t Imp. J. Taneur, Paris.

CRATÆGUS PENTANDRA.

Red Haw.

STAMENS usually 5; anthers dark red-purple. Leaves oval to ovate, acuminate, dark green and scabrous above.

Cratægus pentandra, Sargent, *Rhodora*, iii. 25 (1901).

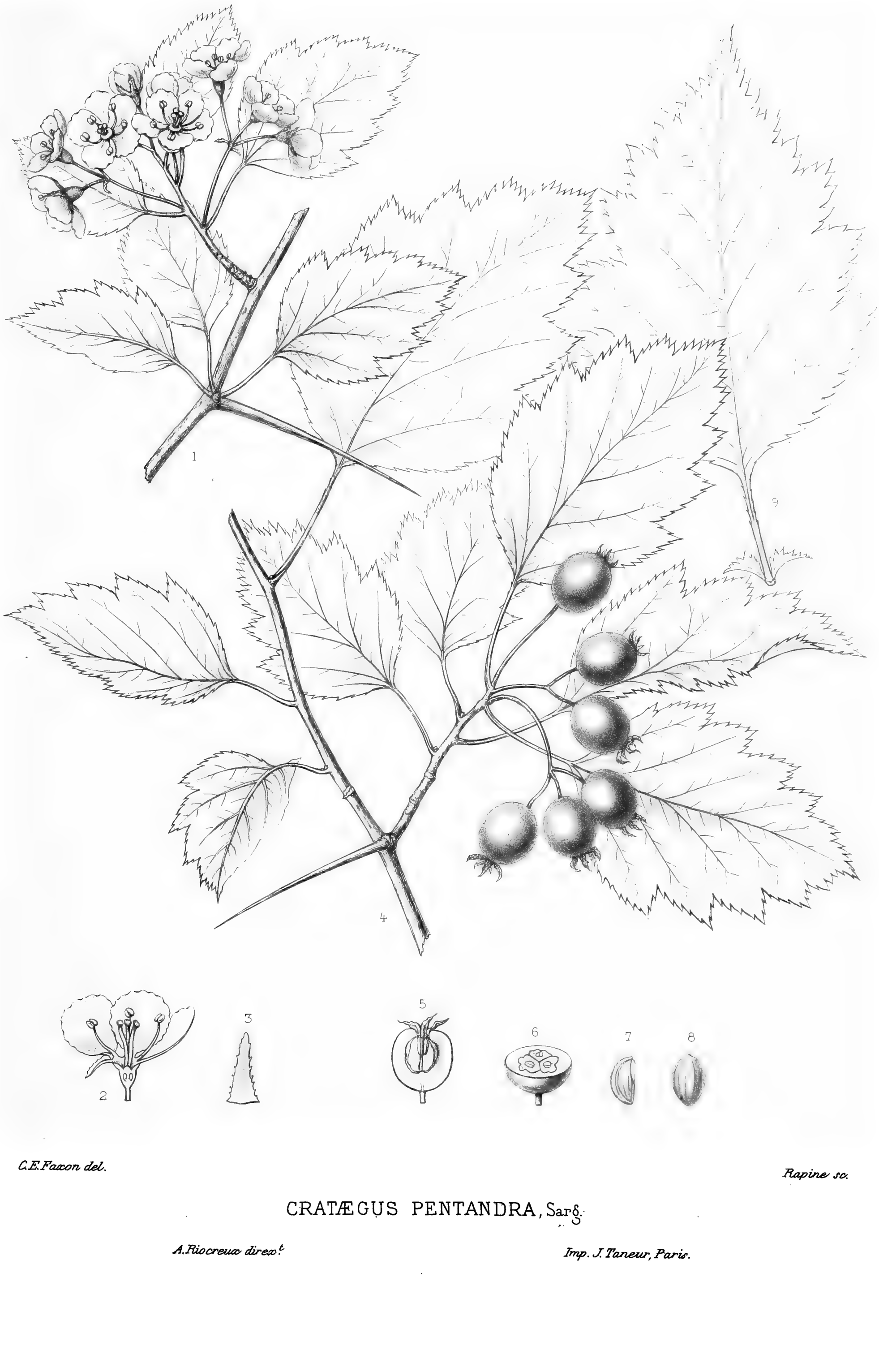
A tree, rarely more than fifteen feet in height, with a straight trunk five or six inches in diameter covered with thin bark separating into papery lustrous pale scales, and stout branches which form a broad rather open head irregular in outline. The branchlets are slender, often zigzag, marked by large pale lenticels, and armed with many thick straight or curved bright chestnut-brown or red-brown spines from an inch to an inch and a half in length; when they first appear they are dark yellow-green and glabrous, becoming in their first summer bright chestnut-brown or sometimes light orange-green when the shoots have grown vigorously, and ashy gray in their second year. The leaves are oval or ovate, acuminate, broadly cuneate or rarely rounded at the entire base, divided above the middle into numerous short acute or acuminate lobes, and coarsely and often doubly serrate, with straight or incurved teeth tipped with small dark glands; nearly fully grown and very thin when the flowers open at the end of May, at maturity they are membranaceous, dark green and roughened above with short rigid pale hairs, pale and glabrous below, from two inches to two inches and a half long and from an inch and a half to two inches wide, with slender yellow midribs and thin primary veins extending to the points of the lobes and only slightly impressed on the upper side; they are borne on slender grooved petioles often winged toward the apex, glandular, with minute dark glands, and usually about an inch long. The stipules are linear, glandular-serrate, and caducous. On vigorous leading shoots the leaves are more deeply lobed than the leaves of lateral branchlets, and are often four inches long and three inches wide, and their stipules are foliaceous, lunate, very coarsely glandular-serrate, and often half an inch in length. The flowers are produced on elongated slender pedicels, in compact compound thin-branched few-flowered glabrous corymbs, with linear or oblong-obovate acute glandular bright red bracts and bractlets. The calyx-tube is narrowly obconic, glabrous, and dark red, and the lobes are linear-lanceolate, entire or finely glandular-serrate, and reflexed after the flowers open. There are usually five but occasionally from six to ten stamens with slender filaments and large dark red-purple anthers, and three styles surrounded at the base by a thin ring of hoary tomentum. The fruit, which ripens about the middle of September and soon falls, is produced in drooping narrow clusters; it is oblong, full and rounded at the ends, dark crimson, lustrous, marked by minute pale dots, and usually about five eighths of an inch long and half an inch thick; the calyx is enlarged and persistent, with elongated strongly incurved lobes which are frequently deciduous before the fruit ripens; the flesh is yellow, thick, dry, and mealy. The three nutlets are thick, with broad and prominent dorsal ridges, and a third of an inch in length.

Cratægus pentandra is not a rare inhabitant of low hills and limestone ridges in the Champlain valley of Vermont, where it is distributed from Bennington and Rutland to Charlotte.

EXPLANATION OF THE PLATE.

PLATE DCLXXXI. CRATÆGUS PENTANDRA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, natural size.
6. Cross section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.
9. A leaf of a vigorous shoot, natural size.



C.E. Faxon del. *Rapine sc.*

CRATÆGUS PENTANDRA, Sarg.

A. Riocreux direx.t *Imp. J. Taneur, Paris.*

CRATÆGUS SILVICOLA.

Haw.

STAMENS 10; anthers purple. Leaves ovate, acute or acuminate, membranaceous, yellow-green.

Cratægus silvicola, Beadle, *Bot. Gazette*, xxviii. 414 (1899). — Mohr, *Contrib. U. S. Nat. Herb.* vi. 549 (*Plant Life of Alabama*).

A tree, sometimes thirty feet in height, with a tall straight stem six or eight inches in diameter covered with close or slightly fissured bark broken into small gray or red-brown scales, and often armed with long stout branched gray spines, and ascending or spreading branches forming a narrow irregular or round-topped head; or on the dry soil of upland forests usually a shrub with several stems. The branchlets are slender, nearly straight, marked by small pale lenticels, and armed with few or many thin straight or somewhat curved bright chestnut-brown spines from an inch and a half to nearly two inches in length; when they first appear they are dark green more or less tinged with red and covered with long pale scattered white hairs; soon becoming glabrous, they are bright red-brown during their first year, and then gradually growing lighter colored they are ultimately ashy gray. The leaves are ovate, acute or acuminate at the apex, full and rounded at the entire base, sharply and often doubly serrate, with gland-tipped teeth, and slightly and irregularly divided into short acute lateral lobes; when they unfold they are dark red and coated with short soft pale hairs which are most abundant on the upper surface, and are about half grown when the flowers open at the end of April, when they are nearly glabrous, and in the autumn they are thin, dark yellow-green and smooth or scabrous above, pale and glabrous below or occasionally villose along the under side of the slender midribs and three or four pairs of thin primary veins extending to the points of the lobes, about two inches long and from an inch and a half to an inch and three quarters wide; they are borne on very slender grooved glandular petioles which are about an inch in length.[1] The stipules are narrow, acuminate, straight or falcate, conspicuously glandular-serrate, and bright red like the inner bud-scales. On vigorous leading shoots the leaves are often deltoid and truncate or slightly cordate at the base, more coarsely serrate and more deeply lobed than the leaves of lateral branchlets, and frequently two inches and a half long and broad. The flowers are about three quarters of an inch in diameter, and are produced on slender pedicels, in compact few-flowered thin-branched compound glabrous corymbs, with linear glandular caducous bright red bracts and bractlets. The calyx-tube is narrowly obconic and glabrous, and the lobes are gradually narrowed, acuminate, glabrous, and entire or glandular-serrate. There are ten stamens with long filaments and large purple anthers, and from three to five styles surrounded at the base by a narrow ring of short pale hairs. The fruit, which ripens late in September and soon falls, is borne on short pedicels, in erect few-fruited clusters, and is subglobose but often a little broader than it is long, red or greenish yellow with a rosy cheek, and about half an inch in diameter, with a broad shallow calyx-cavity and spreading calyx-lobes which usually disappear before the fruit ripens; the flesh is thin, yellow, dry, and mealy. The nutlets vary from three to five in number, and are thick, prominently ridged and grooved on the back, with a high broad ridge, and about a quarter of an inch in length.

Cratægus silvicola is common in the low moist flat woods of northern Alabama and northwestern

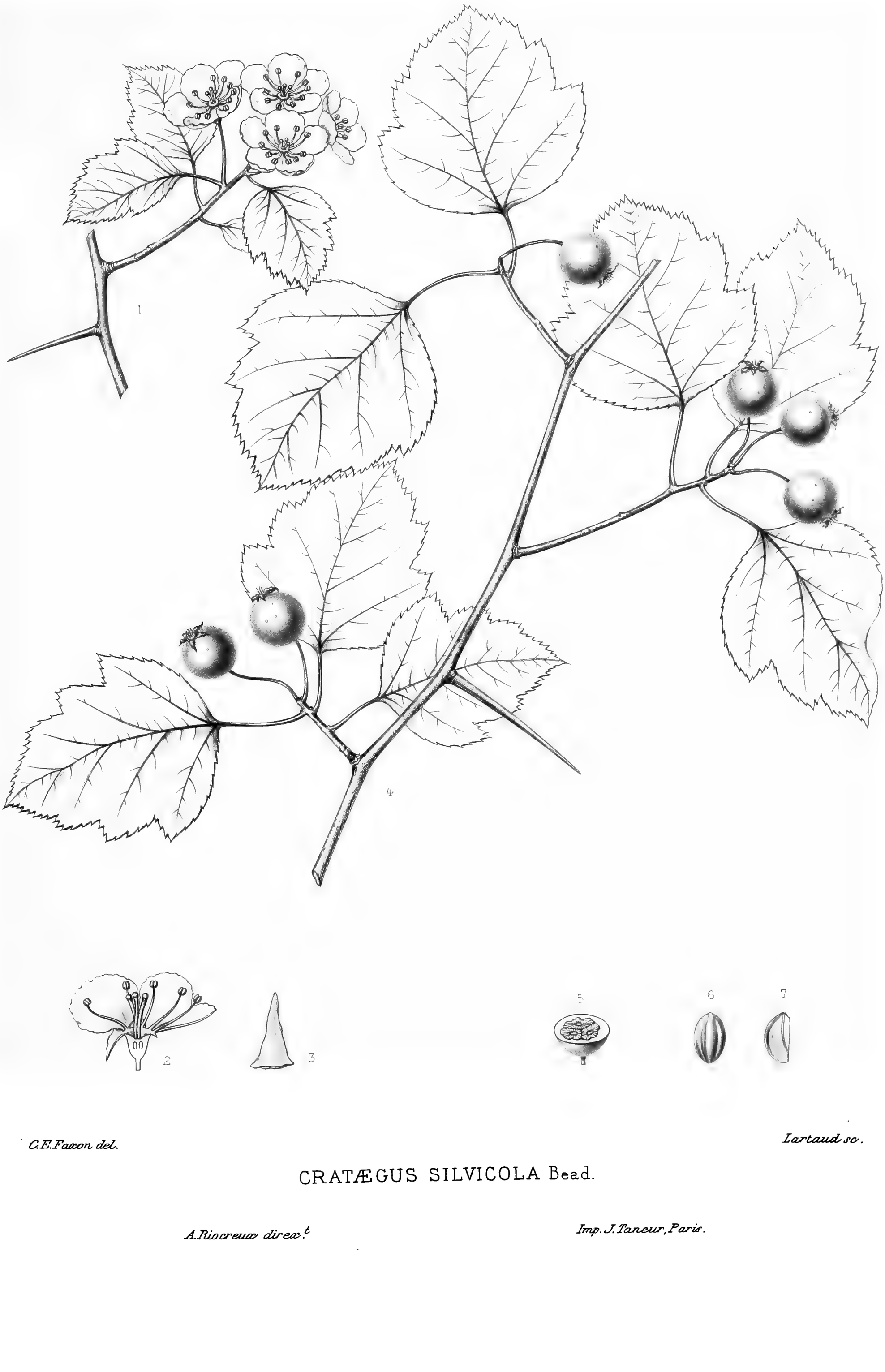
[1] Mr. C. D. Beadle has observed that the leaves from the lower branches and of young plants are much rougher to the touch than the leaves from upper branches and of large and old trees.

and central Georgia, and is occasionally found in the drier uplands of the surrounding country. It was first collected near Dalton, Georgia, in May, 1899, by Mr. F. E. Boynton.

EXPLANATION OF THE PLATE.

PLATE DCLXXXII. CRATÆGUS SILVICOLA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Cross section of a fruit, natural size.
6. A nutlet, rear view, enlarged.
7. A nutlet, side view, enlarged.



C.E. Faxon del. *Lartaud sc.*

CRATÆGUS SILVICOLA Bead.

A. Riocreux direx.t *Imp. J. Taneur, Paris.*

CRATÆGUS COCCINEA.

Red Haw.

STAMENS 10; anthers pale yellow. Leaves elliptical to obovate, coriaceous, dark green, and lustrous.

Cratægus coccinea, Linnæus, *Spec.* i. 476 (1753). — Sargent, *Bot. Gazette,* xxxi. 11.

A bushy tree, occasionally twenty feet in height, with a short trunk eight or ten inches in diameter covered with dark red-brown scaly bark, and stout ascending branches forming a broad round-topped symmetrical head; or often a shrub with many intricately branched stems spreading into broad thickets. The branchlets are slender, straight or somewhat zigzag, marked by oblong pale lenticels and armed with numerous stout straight or slightly curved chestnut-brown lustrous spines from an inch to an inch and a half in length; when they first appear they are light green and covered with long matted pale hairs, and soon becoming glabrous they are bright red-brown and lustrous during their first year, and ultimately ashy gray. The leaves are elliptical or obovate, acute or acuminate at the apex, gradually narrowed from above the middle to the cuneate and entire base, finely and often doubly serrate above, with incurved or straight teeth tipped with minute dark glands, and divided above the middle into several short acute lateral lobes; when the flowers open at the end of May the leaves are about half grown, and are then membranaceous, light yellow-green, covered on the upper surface with soft pale hairs and pubescent along the under side of the thin midribs and four or five pairs of arcuate primary veins extending to the points of the lobes; and in the autumn they are coriaceous, dark green, smooth and very lustrous on the upper surface, paler and rarely pilose on the veins below, from an inch and a half to two inches long and from an inch to an inch and a half wide; they are borne on slender glandular petioles slightly winged at the apex by the decurrent leaf-blades, villose at first but usually glabrous before the autumn, often dark red toward the base, and from three quarters of an inch to an inch long. The stipules vary from lanceolate to oblanceolate, and are straight or falcate, conspicuously glandular-serrate, with dark red glands, and from one half to three quarters of an inch in length. On vigorous leading shoots the leaves are oblong-ovate, oval or often nearly orbicular, more deeply lobed than the leaves of lateral branchlets, and frequently from two inches and a half to three inches long. The flowers vary from one half to three quarters of an inch in diameter, and are produced on slender pedicels, in broad loose compound thin-branched many-flowered villose or tomentose corymbs, with linear-lanceolate coarsely glandular-serrate caducous bracts and bractlets. The calyx-tube is broadly obconic and tomentose or villose, and the lobes are gradually narrowed from broad bases, acute, coarsely glandular-serrate, glabrous or villose, and often bright red toward the apex. There are ten stamens with slender filaments and small pale yellow anthers, and three or four styles. The fruit ripens and falls late in October, and is borne on short stout pedicels, in drooping many-fruited pilose clusters; it is subglobose but occasionally rather longer than broad, dark crimson, marked by scattered dark dots, and about half an inch in diameter; the calyx-cavity is broad and shallow, and the lobes, which are bright red on the upper side toward the base, are wide-spreading or erect; the flesh is thin, yellow, dry, and sweet. The three or four nutlets are prominently ridged on the back, with high grooved ridges, and about a quarter of an inch long.[1]

[1] The name *Cratægus coccinea* was first used by Linnæus in the first edition of his *Species Plantarum* (i. 476) published in 1753. His description of this species, "Cratægus foliis ovatis repando-angulatis serratis glabris," had, however, appeared in 1737 in his *Hortus Cliffortianus*. In both works a species of Plukenet (*Phyt. Bot.* t. 46, f. 4) and a species of Miller (*Cat. Pl. Hort. Angl.* t. 13,

Cratægus coccinea inhabits the slopes of hills and the high banks of salt marshes, growing usually in rich well-drained soil from Essex County, Massachusetts, to Newfoundland, usually in the neighborhood of the sea, and through the valley of the St. Lawrence to western Quebec.

A variety of this species, *Cratægus coccinea rotundifolia*,[1] often grows with it in the same thickets, and can only be distinguished by its glabrous young branches, leaves, and corymbs, while connecting these glabrous plants with those which are extremely villose are others which display all degrees of variation in the development of their villose covering. *Cratægus coccinea rotundifolia* is one of the commonest New England shrubby Thorns, and ranges southward to eastern Pennsylvania.[2]

f. 1) were referred by Linnæus to his *Cratægus coccinea*. Plukenet's plant is preserved in the British Museum. It belongs to the mollis group, but the specimen is so meagre that I have been unable to identify it. Miller's figure perhaps represents a species of the mollis group, but it is certainly not the same plant as the one figured by Plukenet, and I am unable to recognize it. The only representative of *Cratægus coccinea* in Linnæus's herbarium, a specimen so labeled by him, is an entirely different plant from either of those represented in Plukenet's or Miller's figures which Linnæus had referred to his species. Moreover, the specimen is not glabrous but villose on the leaves, corymb, and young branches, and the leaves can hardly be described as "repando-angulatis serratis." The Linnæan specimen is not dated, and it is therefore possible that it was not from this specimen but from Plukenet's or Miller's figure that Linnæus drew his description of *Cratægus coccinea*. There seems in this case, therefore, but one of two courses to follow in considering this name. Either the specimen in Linnæus's herbarium must be ignored as not agreeing with his description, and the name dropped entirely because it was given to a species founded on two distinct plants, neither of which can be satisfactorily determined, or the specimen in the Linnæan herbarium labeled *Cratægus coccinea* by Linnæus himself must be accepted as his type of this species. In view of the fact that the name *Cratægus coccinea* is one of the best known of the names which have been applied to American species of the genus, and as the plant labeled *Cratægus coccinea* by Linnæus is now known to be a common and widely distributed species in the north Atlantic coast region, it is perhaps best to consider the specimen in the Linnæan herbarium as the type of *Cratægus coccinea*.

[1] *Cratægus coccinea rotundifolia*, Sargent, *Bot. Gazette*, xxxi. 14 (1901).

Cratægus rotundifolia, Moench, *Bäume Weiss.* 29, t. 1 (1785). — Poiret, *Lamarck Dict.* iv. 447. — K. Koch, *Verhandl. Preuss. Gart. Vereins*, 236 (*Cratægus und Mespilus*). — Koehne, *Deutsche Dendr.* 231. — Lange, *Rev. Spec. Gen. Cratægi*, 66.

Mespilus glandulosa, Ehrhart, *Beitr.* iii. 20 (1788). — Willdenow, *Enum.* 523. — Schmidt, *Oestr. Baumz.* iv. 33, t. 213. — Watson, *Dendr. Brit.* i. 58, t. 58. — Sprengel, *Syst.* ii. 507 (excl. syn. *Cratægus sanguinea*, Pallas). — Spach, *Hist. Vég.* ii. 62. — Poiret, *l. c.* Suppl. iv. 69. — K. Koch, *Dendr.* i. 145 (excl. syn. *Cratægus sanguinea*, Torrey & Gray).

Cratægus glandulosa, Willdenow, *Berl. Baumz.* 84 (excl. syn. *Cratægus sanguinea*). — Pursh, *Fl.* i. 337 (excl. syn. *Cratægus sanguinea*). — Wendland, *Flora*, 1823, ii. 700. — Torrey, *Fl. Northern and Middle States*, 475. — De Candolle, *Prodr.* ii. 627 (excl. syn. *Cratægus sanguinea*). — Loddiges, *Bot. Cab.* t. 1012. — Hooker, *Fl. Bor. Am.* i. 201. — Loudon, *Arb. Brit.* ii. 817 (in part). — Regel, *Act. Hort. Petrop.* i. 120.

Cratægus horrida, Medicus, *Gesch. Bot.* 84 (1793).

Mespilus rotundifolia, Du Roi, *Harbk. Baumz.* ed. 2, ii. 607 (excl. syn. *Cratægus glandulosa*, Aiton) (1795). — K. Koch, *l. c.* 148.

Cratægus coccinea, Lindley, *Bot. Reg.* xxiii. t. 1957 (not Linnæus) (1837). — Torrey & Gray, *Fl. N. Am.* i. 465 (in part) (not Linnæus).

? Cratægus glandulosa, β *rotundifolia*, Regel, *Act. Hort. Petrop.* i. 120 (1870).

Cratægus coccinea, var. *macracantha*, Sargent, *Silva N. Am.* iv. 96 (in part) (not Dudley) (1892).

[2] The description of *Cratægus coccinea* in an earlier volume of this work (iv. 95) includes a number of forms which are now believed to be distinct, although among them is not the plant which was called *Cratægus coccinea* by Linnæus as shown by his herbarium. The description of *Cratægus coccinea*, var. *macracantha* in that volume was partly drawn from the form now called *Cratægus coccinea rotundifolia*. The plate of *Cratægus coccinea* (t. 130) represents one of the thin-leaved shrubby species long confounded with *Cratægus coccinea*, which I have recently described as *Cratægus pastorum* (*Rhodora*, iii. 24 [1901]).

EXPLANATION OF THE PLATE.

PLATE DCLXXXIII. CRATÆGUS COCCINEA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Cross section of a fruit, natural size.
6. A nutlet, side view, enlarged.
7. A nutlet, rear view, enlarged.

C.E.Faxon del. Lartaud sc.

CRATÆGUS COCCINEA. L.

A.Riocreux direx.t Imp. J.Taneur, Paris.

CRATÆGUS JONESÆ.

Haw.

STAMENS 10; anthers rose color. Leaves elliptical to ovate, coriaceous, dark green and lustrous.

Cratægus Jonesæ, Sargent, *Bot. Gazette*, xxxi. 14 (1901). Cratægus coccinea macracantha, Rand & Redfield, *Fl. Mt. Desert Island*, 98 (1894).

A bushy tree, occasionally twenty feet in height, with a short trunk a foot in diameter covered with dark brown scaly bark, and ascending branches forming a broad open irregular head; or more often a tall broad shrub with numerous thick stems. The branchlets are stout, zigzag for many years, armed with stout straight or occasionally curved bright chestnut-brown lustrous spines from two to three inches in length, and usually pointed toward the base of the branch; when they first appear they are dark green, tomentose, and marked by light red oblong lenticels, becoming orange-brown, glabrous, and very lustrous during their first season, and light gray in their second year. The leaves vary from elliptical to ovate and are acute at the apex, gradually narrowed or broadly cuneate at the entire base, coarsely and doubly serrate above, with spreading or incurved teeth tipped with deciduous dark red glands, and usually divided above the middle into two or three pairs of short acute or acuminate lobes; when the flowers open during the first week of June they are more than half grown, membranaceous, and coated with soft pale hairs, which are most abundant on the under side of the midribs and principal veins, and in the autumn they are thick and coriaceous, dark green and very lustrous on the upper surface, pale and puberulous on the lower surface, from three to four inches long and from two to three inches broad, with stout midribs deeply impressed on the upper side and from four to six pairs of primary veins and conspicuous secondary veinlets; they are borne on stout deeply grooved petioles more or less winged toward the apex by the decurrent bases of the leaf-blades, villose, ultimately glabrous, tinged with red below the middle, from an inch and a half to two inches long, and after midsummer often twisted near the base, thus bringing the lower surface of the leaves to the light. The stipules are linear-lanceolate, entire, from one quarter to one half of an inch in length, and dark green, fading red. On vigorous leading shoots the leaves are often more coarsely serrate and are usually much more deeply lobed than the leaves of lateral branchlets, with broadly winged petioles and falcate coarsely glandular-serrate stipules sometimes an inch in length. The flowers, which are an inch in diameter and bad-smelling, are produced on long slender pedicels, in broad loose lax compound many-flowered thin-branched tomentose corymbs, with linear finely glandular-serrate caducous bracts and bractlets. The calyx-tube is narrowly obconic and tomentose, and the lobes are abruptly narrowed from broad bases, elongated, acute, entire, villose, and reflexed after the flowers open. There are ten stamens with long slender filaments and large pale rose-colored anthers, and two or generally three styles surrounded at the base by a narrow ring of pale tomentum. The fruit ripens usually early in October and hangs on the slender elongated pedicels, in broad many-fruited drooping glabrous or puberulous clusters; it varies from oblong to oblong-obovate and is full and rounded at the ends, bright carmine red, marked by occasional large dark dots, from three quarters of an inch to an inch long and three quarters of an inch broad; the calyx-cavity is broad and shallow, and the lobes are elongated and closely pressed against the fruit; the flesh is thick, yellow, sweet, and mealy. The three or rarely two nutlets are thick, rounded and ridged on the back, with high broad ridges, and about seven sixteenths of an inch long.

Cratægus Jonesæ inhabits the rocky shores of ocean sounds and bays in southeastern Maine, where it is distributed from Belfast Bay to the island of Bar Harbor.[1] This handsome and distinct species has been named for Miss Beatrix Jones,[2] landscape-gardener.

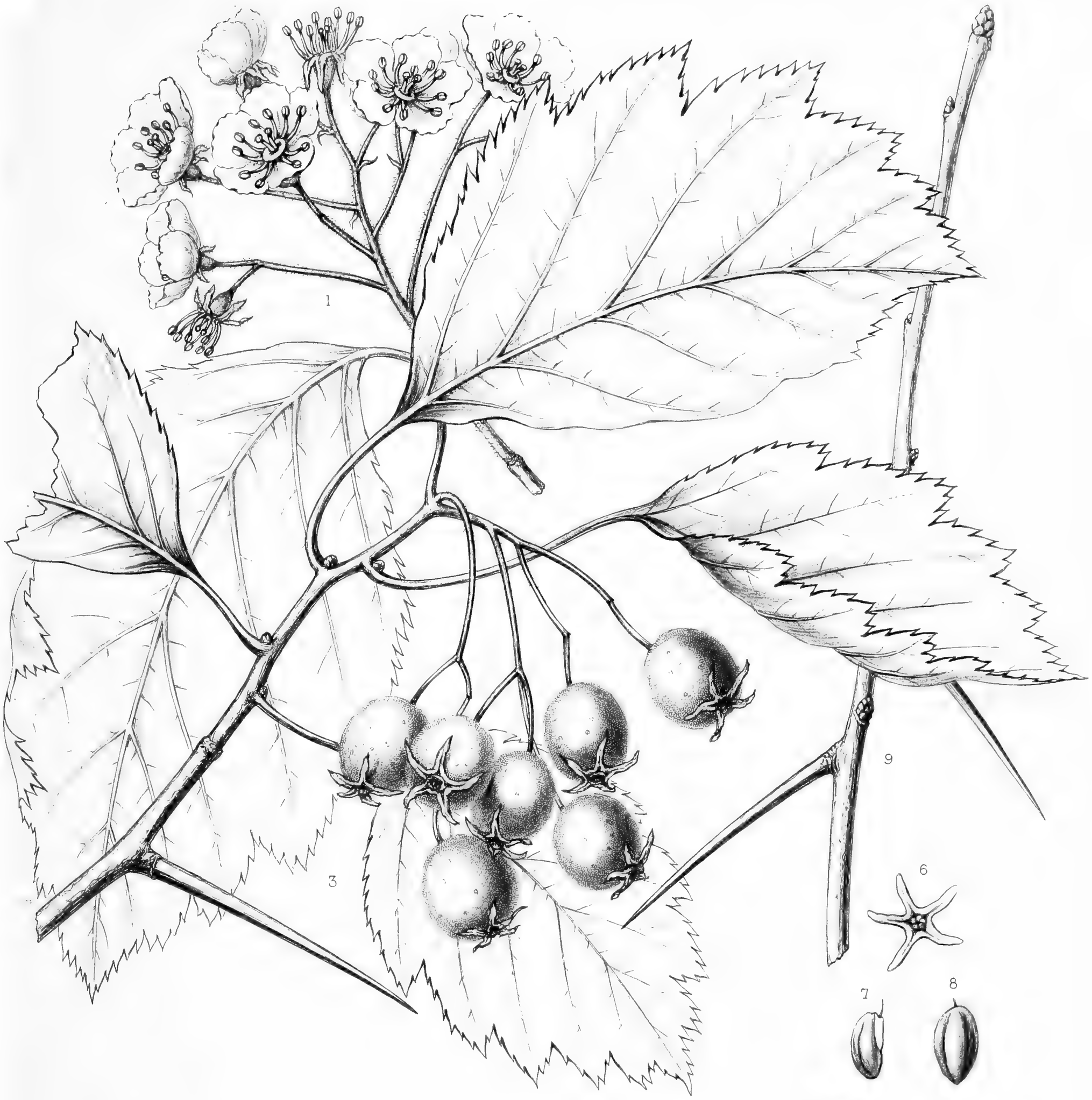
[1] In my original description of *Cratægus Jonesæ* it was said to grow at Orono on the Penobscot River, a fruiting specimen of another species having been mistaken for it. I now know *Cratægus Jonesæ* only in the neighborhood of the ocean.

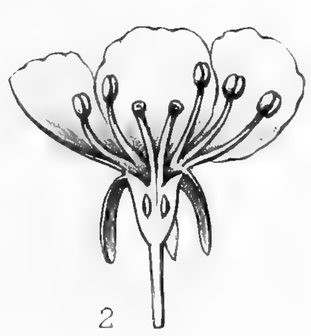
[2] Beatrix Jones (June 19, 1872), the daughter of Frederick Rhinelander Jones and Mary Cadwallader Rawle, was born in New York. On her father's side she is descended from the Rhinelander and Stevens families of New York, who for several generations have been interested in horticulture. On her mother's side she is descended from the Rawle and Cadwallader families of Pennsylvania. Endowed with unusual natural gifts, cultivated by a liberal education, and carefully trained in the United States and Europe to a technical knowledge of the art of landscape-gardening, Miss Jones is the first American woman who has successfully practiced that art as a profession.

EXPLANATION OF THE PLATE.

PLATE DCLXXXIV. CRATÆGUS JONESÆ.

1. A flowering branch, natural size.
2. Vertical section of a flower, natural size.
3. A fruiting branch, natural size.
4. Vertical section of a fruit, natural size.
5. Cross section of a fruit showing the nutlets, natural size.
6. A calyx removed from a ripe fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.
9. End of a winter branchlet, natural size.





C.E. Faxon. del. *Em. Himely sc.*

CRATÆGUS JONESÆ, Sarg.

A. Riocreux direct.t *Imp. J. Taneur, Paris.*

CRATÆGUS MARGARETTA.

Haw.

STAMENS usually 20; anthers yellow. Leaves broadly rhombic to oblong-obovate, thick and firm, dark green.

Cratægus Margaretta, Ashe, *Jour. Elisha Mitchell Sci. Soc.* xvi. pt. ii. 72 (1900). — Gattinger, *Fl. Tennessee*, 100.

A tree, occasionally twenty-five feet in height, with a straight trunk from four to six inches in diameter covered with thin dark gray-brown bark broken into small plate-like closely appressed scales, and thin rather erect branches which form a narrow open head; or sometimes a wide bush with numerous stout spreading stems. The branchlets are slender, generally nearly straight, marked by small oblong pale lenticels, and armed with thin straight or slightly curved bright chestnut-brown spines from three quarters of an inch to an inch and a half in length, or occasionally unarmed; when they first appear they are orange-green, and glabrous or sometimes pubescent for a short time, and during their first summer they become bright chestnut-brown and lustrous, and ashy gray or gray tinged with red during their second year. The leaves are broadly rhombic, oblong-obovate or rarely ovate, acute or rounded at the apex, gradually narrowed and usually entire below, coarsely and often doubly crenulate-serrate above, with mostly glandless teeth, and often divided above the middle, or frequently only at the apex, into short broad rounded or acute lobes; when the flowers open early in May they are membranaceous, roughened above by short pale hairs and glabrous below, and in the autumn they are firm and rather leathery in texture or subcoriaceous, glabrous, smooth, dark green and somewhat lustrous on the upper surface, pale on the lower surface, from an inch to an inch and a quarter long and about an inch wide, with yellow midribs and from three to five pairs of thin primary veins extending very obliquely to the points of the lobes and deeply impressed on the upper side; they are borne on slender grooved petioles often slightly winged toward the apex, glandular at first on the upper side, with minute dark red caducous glands, and from half an inch to an inch in length. The stipules are linear, acuminate, glandular-serrate, and soon disappear. On vigorous leading shoots the leaves are broadly ovate or semiorbicular, usually more deeply and more generally lobed than the leaves of lateral branchlets, often three inches long and from two to three inches wide. The flowers are about three quarters of an inch in diameter, and are produced on slender elongated pedicels, in three to twelve-flowered compound thin-branched slightly villose corymbs, with narrow oblong-obovate acute or acuminate conspicuously glandular bracts and bractlets. The calyx-tube is narrowly obconic and slightly villose toward the base, or glabrous, and the lobes are gradually narrowed from broad bases, acuminate or short-pointed at the apex, finely and irregularly glandular-serrate, glabrous, or villose on the inner surface, and reflexed after the flowers open. There are usually twenty stamens with slender filaments and small yellow anthers, and two or three styles surrounded at the base by a narrow ring of pale tomentum and villose below the middle with occasional long spreading hairs. The fruit ripens and mostly falls toward the end of September and is borne in few-fruited drooping clusters; it is short-oblong and full and rounded at the ends or subglobose and flattened at the ends, dull dark red or rusty orange-red marked by occasional dark dots, and about half an inch long; the calyx-cavity is broad and shallow, and the lobes are spreading or erect and frequently deciduous before the fruit ripens; the flesh is thin, yellow, dry, and mealy. The two or three nutlets are thick, conspicuously grooved and ridged on the back, with broad rounded ridges, and about a quarter of an inch long.

Cratægus Margaretta grows by the banks of streams and on open hillsides. It has been found in

central Michigan,[1] central Iowa,[2] along the Des Peres River at Webster, St. Louis County, Missouri,[3] at Springfield, Missouri, and in middle Tennessee.[4]

The specific name is formed from the Christian name of Mrs. J. O. Wilcox of Ashe County, North Carolina.[5]

[1] *Cratægus Margaretta* was collected near Lansing, Michigan, in May, 1901, by Professor W. J. Beal.

[2] Quarry, Iowa, F. W. Forest, May 19, 1900 (No. 1996); Steamboat Rock, Iowa, L. H. Pammel, June 14, 1900 (No. 1989).

[3] In the Gray Herbarium there is a specimen of *Cratægus Margaretta* collected in Missouri by E. Hall in 1870, the place of collection being not otherwise given; and in the Gray Herbarium there is also an Iowa specimen collected by M. Jones in 1877. *Cratægus Margaretta* was first collected on the Des Peres River by H. Eggert in the spring of 1886; and in Springfield, Missouri, where this tree grows to a large size and is abundant, it was first noticed by Professor Trelease and myself in September, 1900.

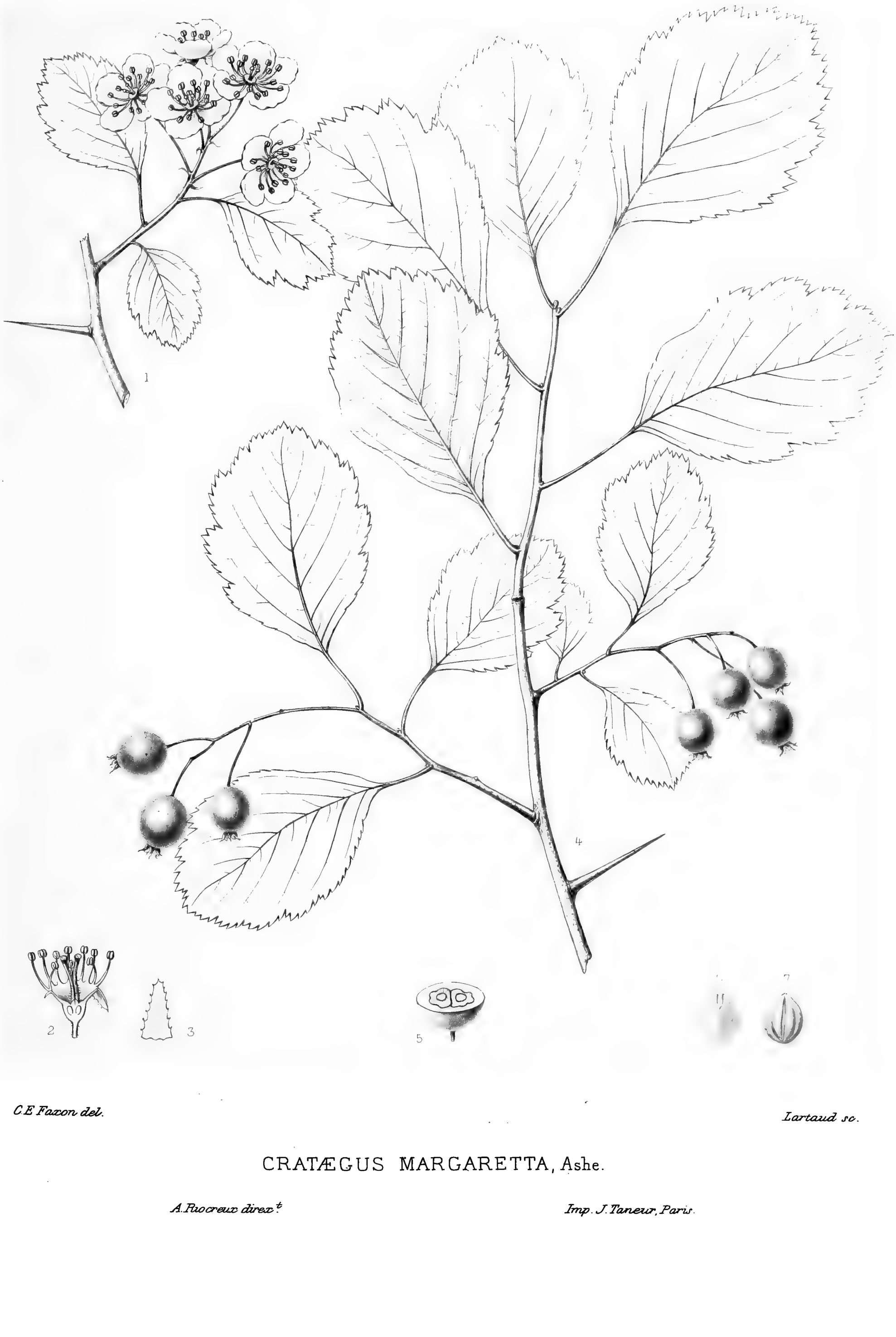
[4] *Cratægus Margaretta* was collected on limestone hills in West Nashville, Tennessee, where it is a low shrub, on May 2, 1900, by Mr. T. G. Harbison.

[5] W. W. Ashe, *in litt.*

EXPLANATION OF THE PLATE.

PLATE DCLXXXV. CRATÆGUS MARGARETTA.

1. Portion of a flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Cross section of a fruit, natural size.
6. A nutlet, front view, enlarged.
7. A nutlet, rear view, enlarged.



C.E Faxon del.

Lartaud sc.

CRATÆGUS MARGARETTA, Ashe.

A. Riocreux direx.t

Imp. J. Taneur, Paris.

CRATÆGUS SUCCULENTA.

Scarlet Haw.

STAMENS 20; anthers rose color. Leaves elliptical, gradually narrowed at the ends, coriaceous, dark green, and lustrous.

Cratægus succulenta, Link, *Handb.* ii. 78 (1831). — Lange, *Rev. Spec. Gen. Cratægi*, 82, t. 8 B.

? Mespilus corallina, Tausch, *Flora*, 1838, ii. 717 (not Desfontaines).

? Cratægus macracantha, Loudon, *Arb. Brit.* ii. 819, f. 572 (not Lindley) (1838).

? Phœnopyrum corallinum, Roemer, *Fam. Nat. Syn.* iii. 154 (1847).

Cratægus glandulosa, d **succulenta**, Lauche, *Deutsche Dendr.* ed. 2, 573 (1883).

Cratægus coccinea, var. **macracantha**, Sargent, *Garden and Forest*, ii. 412 (in part) (1889); *Silva N. Am.* iv. 96 (in part) t. 131. — Watson & Coulter, *Gray's Man.* ed. 6, 165 (in part).

Cratægus rotundifolia, b **succulenta**, Dippel, *Handb. Laubholzk.* iii. 441 (1893).

A bushy tree, occasionally twenty feet in height, with a short stem five or six inches in diameter covered with dark red-brown scaly bark, and stout ascending branches forming a broad irregular head; or usually shrubby and much smaller and often flowering when only a few feet in height. The branchlets are stout, more or less zigzag, marked by large oblong pale lenticels, and armed with numerous stout slightly curved bright chestnut-brown lustrous spines from an inch and a half to two inches and a half in length; when they appear they are glabrous, green tinged with red or orange, becoming dark orange-brown and very lustrous before midsummer, dull gray-brown in their second season, and ultimately ashy gray. The leaves are elliptical, acute or acuminate at the apex, gradually narrowed from near the middle and entire at the base, coarsely and usually doubly serrate, with spreading glandular teeth, and divided above the middle into numerous short acute lobes; nearly fully grown when the flowers open at the end of May or early in June, they are then membranaceous, covered above with soft pale hairs and puberulous or rarely nearly glabrous on the lower surface, and at maturity they are coriaceous, dark green, glabrous and somewhat lustrous above, pale yellow-green and mostly puberulous along the stout yellow midribs and four to seven pairs of slender veins extending obliquely to the points of the lobes and deeply impressed on the upper side, usually from two inches to two inches and a half long and from an inch to an inch and a half wide; or on leading shoots occasionally ovate and often three inches and a half long and three inches wide; they are borne on stout grooved petioles more or less winged above by the decurrent bases of the leaf-blades, generally about half an inch long and frequently bright red after midsummer. The stipules are linear, acuminate, finely glandular-serrate, and caducous. The flowers are about two thirds of an inch in diameter, and are produced on long slender pedicels, in broad lax compound many-flowered villose corymbs, with linear-acuminate glandular-serrate bracts and bractlets. The calyx-tube is narrowly obconic, villose or glabrous, and the lobes are broad, acute, laciniate, glandular, with large bright red glands, generally villose, and reflexed after the flowers open. There are usually twenty but sometimes only fifteen stamens with slender filaments and small rose-colored anthers, and two or three styles surrounded at the base by a ring of pale hairs. The fruit, which begins to ripen about the middle of September and sometimes does not fall until the end of October, is borne on slender elongated pedicels, in broad loose many-fruited drooping clusters; it is globose, bright scarlet marked by occasional large pale dots, and from one third to two thirds of an inch in diameter; the calyx is prominent, with a broad shallow depression and much enlarged coarsely serrate closely appressed persistent lobes; the flesh is thick, yellow, very juicy, sweet, and pulpy. The two or three nutlets are

broad, prominently ridged on the back, with broad rounded ridges, and penetrated on each of the inner faces by a broad deep depression.

Cratægus succulenta is common from the valley of the St. Lawrence River near Montreal to the coast of New England, and through northern New York and southern Ontario to northern Illinois, growing on open hillsides often on limestone. First distinguished in Europe from cultivated plants, and long an inhabitant of American and European gardens, it was formerly confounded with *Cratægus coccinea* by American botanists.

[1] The earliest mention of *Cratægus succulenta* was in the seed-list of the Göttingen Botanic Garden for the year 1823, when the name only is mentioned; and a *Mespilus succulenta* appears without description in the second and third editions of Sweet's *Hortus Botanicus* published in 1830 and 1839. This species is sometimes found in gardens under the name of *Cratægus Downingii*, a name which has probably never been published. Plate No. cxxxi., in the fourth volume of this work, purporting to represent *Cratægus coccinea*, var. *macracantha*, properly represents *Cratægus succulenta*, as I now understand this species.

The range of *Cratægus succulenta* is still very imperfectly known.

CRATÆGUS GEMMOSA.

Haw.

STAMENS 20; anthers rose color. Leaves broadly oval or rarely obovate.

Cratægus gemmosa, Sargent, *Bot. Gazette*, xxxiii. 119 (1902).

A tree, occasionally thirty feet in height, with a tall trunk ten or twelve inches in diameter covered with dark brown scaly bark, and stout spreading or ascending branches forming a broad rather open symmetrical head; or often shrubby and frequently flowering when only a few feet tall. The branchlets are stout, zigzag, glabrous, marked by numerous oblong pale lenticels, and armed with straight or slightly curved thick chestnut-brown spines usually about two inches in length; dark orange-brown when they first appear, the branchlets are bright red-brown or gray-brown and lustrous for two or three years, and ultimately become dark brown. The winter-buds are globose, and sometimes nearly a quarter of an inch in diameter, with broad ovate rounded shining bright red-brown outer scales pale and scarious on the margins. The leaves are broadly oval or rarely broadly obovate, acute or acuminate, gradually narrowed and cuneate or occasionally rounded at the base, sharply and usually doubly serrate from below the middle, with straight glandular teeth, and often slightly lobed toward the apex, with short acute lobes; dark red and villose as they unfold, they are nearly fully grown when the flowers open from the middle to the end of May, and are then membranaceous, light yellow-green, nearly glabrous above and pale and villose below, and at maturity they are thick and firm in texture, very dark dull green on the upper surface, and pale and pubescent on the lower surface along the stout yellow midribs which are deeply impressed and occasionally puberulous on the upper side and along the four or five pairs of slender primary veins extending obliquely to the apex of the leaf; they vary from an inch and a half to two inches and a half in length and from an inch to two inches in width, and are borne on stout deeply grooved villose or pubescent petioles more or less winged above, glandular while young, with minute bright red caducous glands, usually pink in the autumn, and from one quarter to one half of an inch in length. The stipules are linear, acuminate, glandular, bright red, and caducous. On vigorous leading shoots the leaves are more coarsely serrate, frequently divided into short acute lateral lobes, and often four inches long and three inches wide, with rose-colored midribs and stout spreading primary veins; and their stipules are often lunate, acuminate, coarsely glandular-serrate, and frequently a quarter of an inch long. The flowers vary from one half to three quarters of an inch in diameter, and are produced in slender-branched open compound villose many-flowered corymbs, with lanceolate or oblanceolate acuminate glandular-serrate conspicuous bracts and bractlets. The calyx-tube is narrowly obconic, more or less villose, with matted pale hairs, or nearly glabrous, and the lobes are lanceolate, acuminate, glabrous or villose on the outer surface, villose on the inner surface, coarsely glandular-serrate, with bright red glands, and reflexed after anthesis. There are twenty stamens with small rose-colored anthers, and two or three styles surrounded at the base by a narrow ring of pale tomentum. The fruit, which ripens early in October and becomes very succulent just before it is ready to fall, is borne in drooping many-fruited glabrous or puberulous clusters; it is subglobose or short-oblong, scarlet, lustrous, half an inch in diameter when fully ripe, and crowned by the persistent calyx with an elongated narrow tube and reflexed villose lobes which are bright red toward the base on the upper side; the flesh is thick, yellow, sweet, and succulent, and only slightly adheres to the two or usually three nutlets. These are broad and flat and a quarter of an inch in length, with prominent rounded dorsal ridges, and are penetrated on each of the inner faces by a short broad deep cavity.

Cratægus gemmosa grows in rich forest glades and on the margins of woods usually in low moist rich soil, and is distributed from the neighborhood of Rochester, New York,[1] and Toronto, Ontario, through Ontario[2] to the southern peninsula of Michigan,[3] where it is very abundant as far north at least as the neighborhood of Saginaw,[4] and where it probably grows to its largest size.[5]

[1] *Cratægus gemmosa* was found in October, 1901, by Mr. John Dunbar in the Genesee Valley Park, Rochester.

[2] In Ontario *Cratægus gemmosa* is common in the neighborhood of Toronto, where it was collected in May and October, 1901, by Mr. D. W. Beadle, and near London, where it was found by C. S. Sargent in September, 1901.

[3] The earliest specimen of this tree which I have seen was collected near Grand Rapids, Michigan, by Mr. C. W. Fallass in May, 1895.

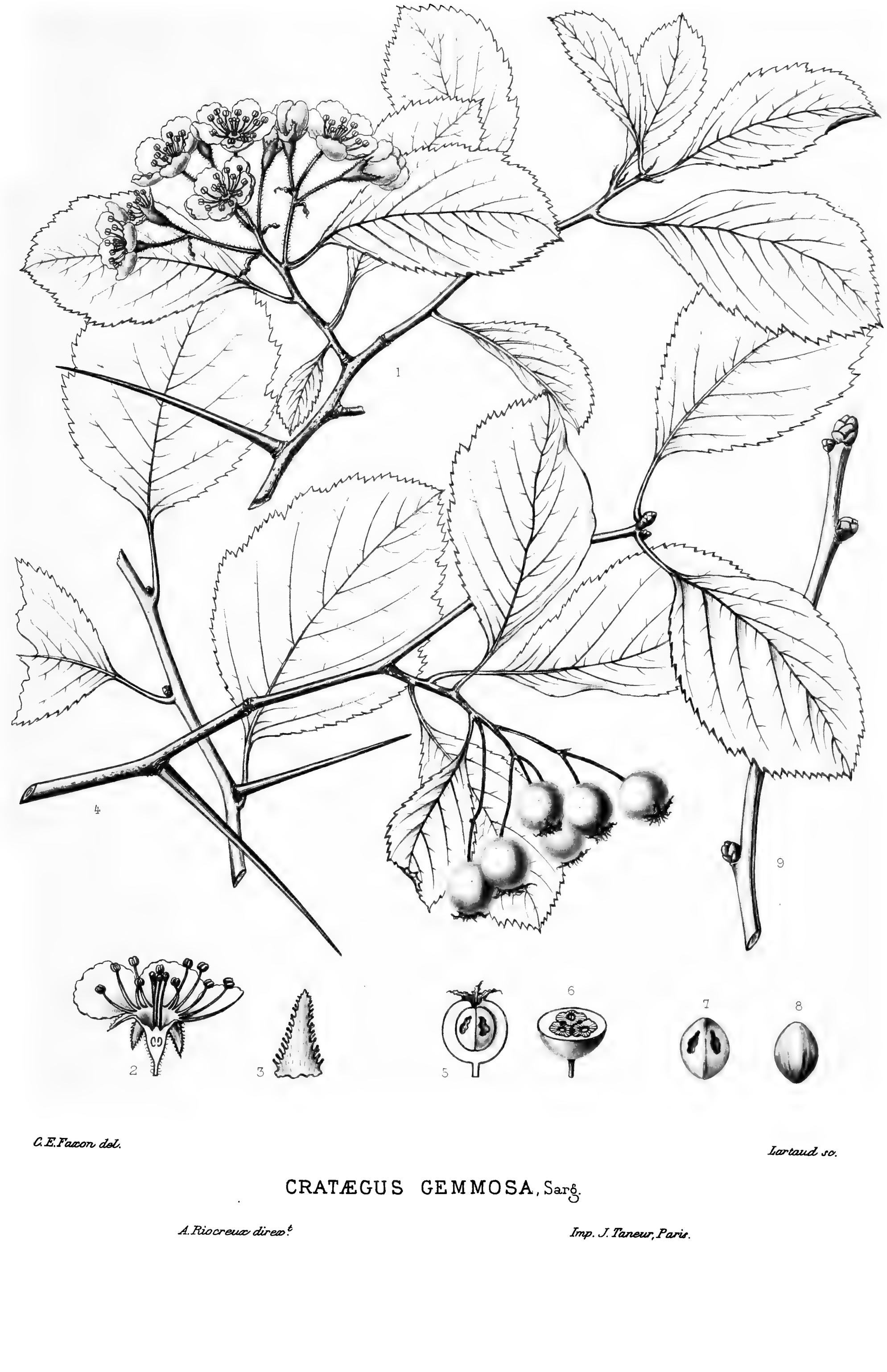
[4] *Teste* Miss E. J. Cole.

[5] The largest specimen of *Cratægus gemmosa* which I have seen is growing at the southeast corner of Curtis and Forests streets in Grand Rapids, Michigan. This tree as measured by Miss Cole of that city in the autumn of 1901 is thirty feet high, with a trunk circumference two feet above the ground of thirty-four inches, and a spread of branches in one direction of twenty-five feet and seven inches, and of twenty-two feet in the other direction.

EXPLANATION OF THE PLATE.

PLATE DCLXXXVI. CRATÆGUS GEMMOSA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, enlarged.
6. Cross section of a fruit, enlarged.
7. A nutlet, inner face, enlarged.
8. A nutlet, rear view, enlarged.
9. A winter branchlet, natural size.



C.E. Faxon del. *Lartaud sc.*

CRATÆGUS GEMMOSA, Sarg.

A. Riocreux direx.t *Imp. J. Taneur, Paris.*

CRATÆGUS ILLINOIENSIS.

Scarlet Haw.

STAMENS 10; anthers rose color. Leaves broadly obovate to oval, acute or rounded at the apex, subcoriaceous, dark green.

Cratægus Illinoiensis, Ashe, *Jour. Elisha Mitchell Sci. Soc.* xvi. pt. ii. 76 (1900).

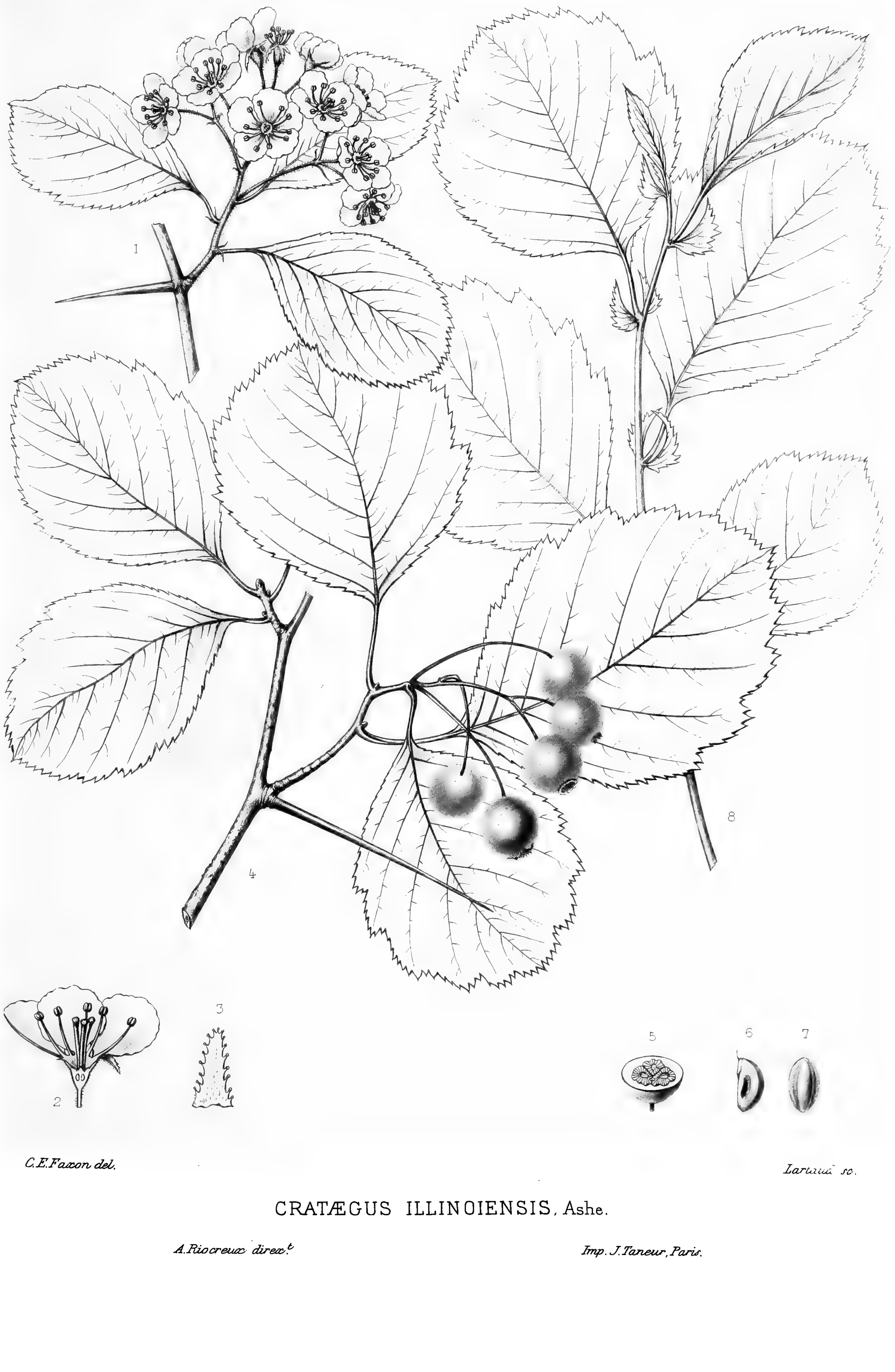
A tree, rarely more than seventeen or eighteen feet in height, with a stem four or five inches in diameter covered with thin close bark broken on the surface into pale plate-like scales, and divided into several virgate branches forming a wide open-topped head. The branchlets are stout, somewhat zigzag, marked by small dark lenticels, and armed with numerous slender straight or somewhat curved bright chestnut-brown shining spines from an inch and a half to nearly three inches in length; dark orange-green and covered with scattered pale caducous hairs when they first appear, they become bright orange-brown and lustrous during their first season, dark brown in their second year, and ultimately ashy gray. The leaves vary from broadly obovate to oval, and are rounded or rarely acute at the wide apex, broadly cuneate and entire at the base, coarsely and often doubly serrate above, with straight or incurved teeth tipped with minute deciduous glands, and sometimes slightly and irregularly divided toward the apex into short acute lobes; when they first unfold they are covered on the lower surface with a thick coat of hoary tomentum and are pilose on the upper surface, and when the flowers open about the twentieth of May they are membranaceous, yellow-green, and covered above with short pale hairs and pubescent below; in the autumn they are thick and firm in texture, dark green and glabrous above, pale and pubescent below, particularly along the stout midribs and four to six pairs of primary veins deeply impressed on the upper side, from two inches to two inches and a half in length and from an inch and a half to two inches in width; they are borne on stout grooved petioles slightly winged toward the apex by the decurrent bases of the leaf-blades, usually from one half to two thirds of an inch long, and generally bright red below the middle after midsummer. The stipules are linear, acuminate, finely glandular-serrate, and caducous. On vigorous leading shoots the leaves are usually elliptical, acute, or acuminate, more coarsely dentate and more often lobed than the leaves of lateral branchlets, sometimes decurrent nearly to the base of the stout petioles, from three to four inches long and from two inches and a half to three inches wide, with foliaceous, lunate, coarsely glandular-dentate, stipitate stipules often three quarters of an inch in length. The flowers are about five eighths of an inch in diameter, and are produced on slender pedicels, in broad compact many-flowered villose compound corymbs, with narrow obovate acute or acuminate glandular bracts and bractlets. The calyx-tube is narrowly obconic and coated with long matted pale hairs, and the lobes are broad, acuminate, very coarsely glandular-serrate, with large stipitate bright red glands, glabrous on the outer surface except at the base, villose on the inner surface, and reflexed after the flowers open. There are ten stamens with small rose-colored anthers, and two or usually three styles. The fruit, which ripens early in October but does not fall until after the beginning of winter, is borne on stout bright red pedicels, in few-fruited drooping villose clusters, and is globose, scarlet, lustrous, marked by occasional dark dots, more or less villose at the ends, and half an inch in diameter; the calyx is prominent, with a short villose tube, a deep narrow cavity, and spreading lobes which are lanceolate from broad bases, sparingly glandular-serrate or nearly entire, villose and mostly deciduous before the fruit ripens; the flesh is thin, yellow, dry, and mealy, and very firm and solid until after the fruit falls. The two or three nutlets are broad and thick, prominently ridged and grooved on the back, with broad high ridges, penetrated on each of the inner faces by a broad deep depression, and a quarter of an inch long.

Cratægus Illinoiensis grows in open woods along the gravelly banks of small streams in Stark and Peoria counties, Illinois, where it is not common. It was first collected in May, 1889, by Mr. Virginius H. Chase.

EXPLANATION OF THE PLATE.

PLATE DCLXXXVII. CRATÆGUS ILLINOIENSIS.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Cross section of a fruit, natural size.
6. A nutlet, side view, enlarged.
7. A nutlet, rear view, enlarged.



C.E.Faxon del. *Lariviè sc.*

CRATÆGUS ILLINOIENSIS, Ashe.

A.Riocreux direx.t *Imp. J.Taneur, Paris.*

CRATÆGUS INTEGRILOBA.

Red Haw.

STAMENS 10; anthers pink; calyx-lobes entire. Leaves broadly obovate to oval or rhomboidal, dark green, and lustrous.

Cratægus integriloba, Sargent, *Rhodora*, iii. 78 (1901).

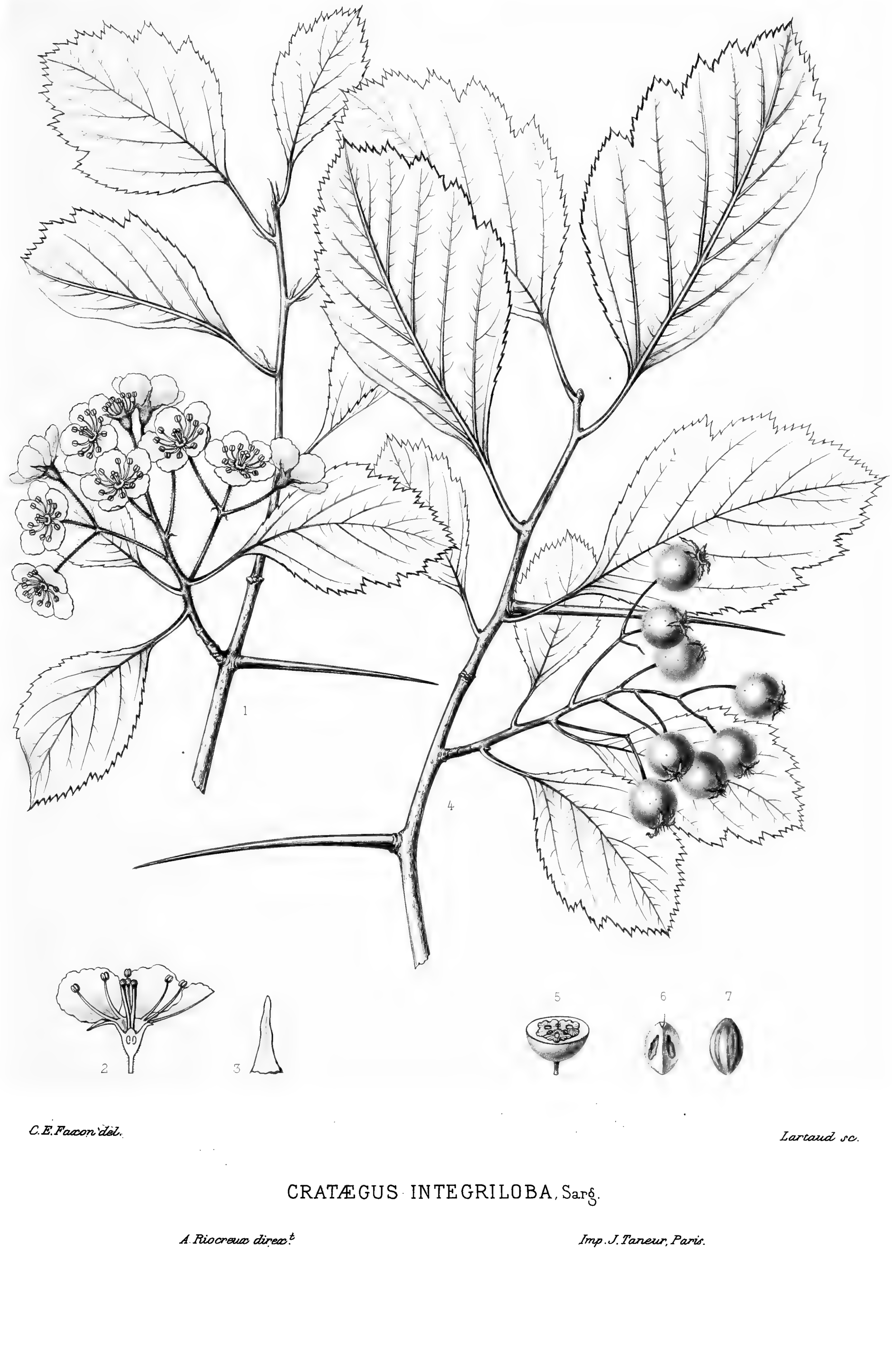
A tree, occasionally eighteen or twenty feet in height, with a straight erect stem six or eight inches in diameter, and wide-spreading or erect branches forming an open irregular head. The branchlets are stout, nearly straight or occasionally slightly zigzag, marked by small scattered pale lenticels, and armed with stout nearly straight bright chestnut-brown lustrous spines from an inch and a half to two inches and a half in length and often pointed toward the base of the branch; dark orange-green and glabrous when they first appear, the branchlets become very lustrous and red-brown or orange-brown during their first summer, and ultimately dull ashy gray. The leaves are broadly obovate, oval or rhomboidal, acute at the apex, gradually or abruptly narrowed and cuneate below the middle, entire toward the base, coarsely doubly serrate above, with spreading glandular teeth, and irregularly divided into numerous short acute or acuminate lobes; in early spring they are coated with soft pale caducous hairs, and in the autumn they are glabrous, thin but firm in texture, dark green and lustrous on the upper surface, pale yellow-green on the lower surface, from an inch and a half to three inches long and from an inch and a quarter to two inches wide, with slender midribs often dark red at the base, and with from four to six pairs of slender primary veins deeply impressed on the upper side; they are borne on stout grooved petioles more or less broadly winged toward the apex, puberulous at first but soon glabrous, often red on the lower side, and from one third to three quarters of an inch in length. The stipules are linear, finely glandular-serrate, villose, light red, from three quarters of an inch to an inch long, and caducous. The flowers open during the first week in June, when the leaves are nearly fully grown, and are three quarters of an inch in diameter; they are produced in broad open many-flowered compound thin-branched villose corymbs, with linear glandular-serrate caducous bracts and bractlets. The calyx-tube is broadly obconic, coated toward the base with long matted white hairs and glabrous above, and the lobes are linear-lanceolate, elongated, entire, or very rarely furnished with an occasional caducous gland. There are ten stamens with stout slender filaments and large rose-colored anthers, and two or three styles surrounded at the base by a narrow ring of soft white hairs. The fruit ripens at the end of September or early in October and is borne on short stout pedicels, in drooping or erect many-fruited slightly villose clusters; it is subglobose, bright scarlet, lustrous, rarely marked by large pale dots, and from one third to one half of an inch in diameter; the calyx is prominent, with a comparatively broad deep cavity and elongated entire lobes which are dark red on the upper side at the base, much reflexed and persistent; the flesh is thin, yellow, sweet, and pulpy. The two or three nutlets are thick and broad, prominently and often doubly ridged on the back, penetrated on each of the inner faces by a broad deep longitudinal groove, and about a quarter of an inch long.

Cratægus integriloba grows on low limestone ridges in the region south of the St. Lawrence River near the Lachine Rapids, where it was discovered at Beauharnois in August, 1899, by Mr. J. G. Jack, who has found it also at Caughnawaga, Rockfield, and Adirondack Junction.

EXPLANATION OF THE PLATE.

PLATE DCLXXXVIII. CRATÆGUS INTEGRILOBA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Cross section of a fruit, enlarged.
6. A nutlet, front view, enlarged.
7. A nutlet, rear view, enlarged.



C.E. Faxon del.

Lartaud sc.

CRATÆGUS INTEGRILOBA, Sarg.

A. Riocreux direx.t

Imp. J. Taneur, Paris.

CRATÆGUS MACRACANTHA.

Scarlet Haw.

STAMENS 10; anthers pale yellow. Leaves broadly obovate to elliptical or oval, coriaceous, dark green, and lustrous.

Cratægus macracantha, Koehne, *Deutsche Dendr.* 236 (in part) (not Loudon) (1893). — Lange, *Rev. Spec. Gen. Cratægi*, 67, t. 8 A.

Mespilus odorata, Wendland, *Flora*, 1823, ii. 700 (not *Cratægus odorata*, Bosc).

Cratægus glandulosa, β **macracantha**, Lindley, *Bot. Reg.* xxii. t. 1912 (1836).

Cratægus macracantha, var. **minor**, Loudon, *Arb. Brit.* ii. 819, f. 573 (1838).

Cratægus coccinea, var. **macracantha**, Dudley, *Bull. Cornell Univ.* ii. 33 (*Cayuga Flora*) (1886). — Sargent, *Garden and Forest*, ii. 412 (in part); *Silva N. Am.* iv. 96 (in part). — Watson & Coulter, *Gray's Man.* ed. 6, 165 (in part). — Lange, *Rev. Spec. Gen. Cratægi*, 30.

Cratægus rotundifolia, a **minor**, Dippel, *Handb. Laubholzk.* iii. 440, f. 215 (1893).

A tree, occasionally fifteen feet in height, with a tall stem five or six inches in diameter covered with pale close bark, and stout wide-spreading branches forming an open rather irregular head; or more often a tall broad shrub sometimes flowering when only a few feet high. The branchlets are stout, slightly zigzag, marked by large pale lenticels, and armed with numerous slender usually curved very sharp bright chestnut-brown lustrous spines from two inches and a half to four inches in length; when they appear they are glabrous and dark green more or less tinged with red, and during their first season they become light chestnut-brown and very lustrous, and dull reddish brown the following season. The leaves vary from broadly obovate to elliptical or oval, and are acute or rounded and sometimes short-pointed at the apex, gradually or abruptly narrowed and cuneate at the entire base, coarsely and often doubly serrate above, with straight or incurved gland-tipped teeth, and usually divided above the middle into numerous short acute or acuminate lobes; coated on the upper surface with soft pale hairs and often bright red when they unfold, they are more than half grown when the flowers open late in May, and are then dull yellow-green and nearly glabrous on the upper surface and pale and puberulous below, particularly along the midribs and veins, and in the autumn they are coriaceous, dark green, lustrous, and glabrous above, frequently puberulous below along the stout midribs and four to six pairs of slender primary veins extending obliquely to the points of the lobes and deeply impressed on the upper side, and usually from two inches to two inches and a half long and from an inch and a half to two inches wide; they are borne on stout grooved petioles more or less winged above by the decurrent bases of the leaf-blades, generally about half an inch long and frequently bright red after midsummer. Their stipules are linear, finely glandular-serrate, and caducous. On vigorous leading shoots the leaves are often full and rounded at the base, coarsely dentate, from three to four inches long, and from two inches and a half to three inches wide. The flowers are about three quarters of an inch in diameter, and are produced on long slender pedicels, in broad loose thin-branched more or less villose many-flowered compound corymbs, with linear acuminate finely glandular-serrate caducous bracts and bractlets. The calyx-tube is narrowly obconic, more or less villose or nearly glabrous, and the lobes are narrow, elongated, acuminate, glandular, with minute dark glands, glabrous on the outer surface, slightly villose on the inner surface, and reflexed after the flowers open. There are usually ten but occasionally from eight to twelve stamens with pale yellow anthers, and two or three styles surrounded at the base by a broad ring of hoary tomentum. The fruit, which ripens at the end of September and often does not entirely fall until a month later, is borne in broad erect

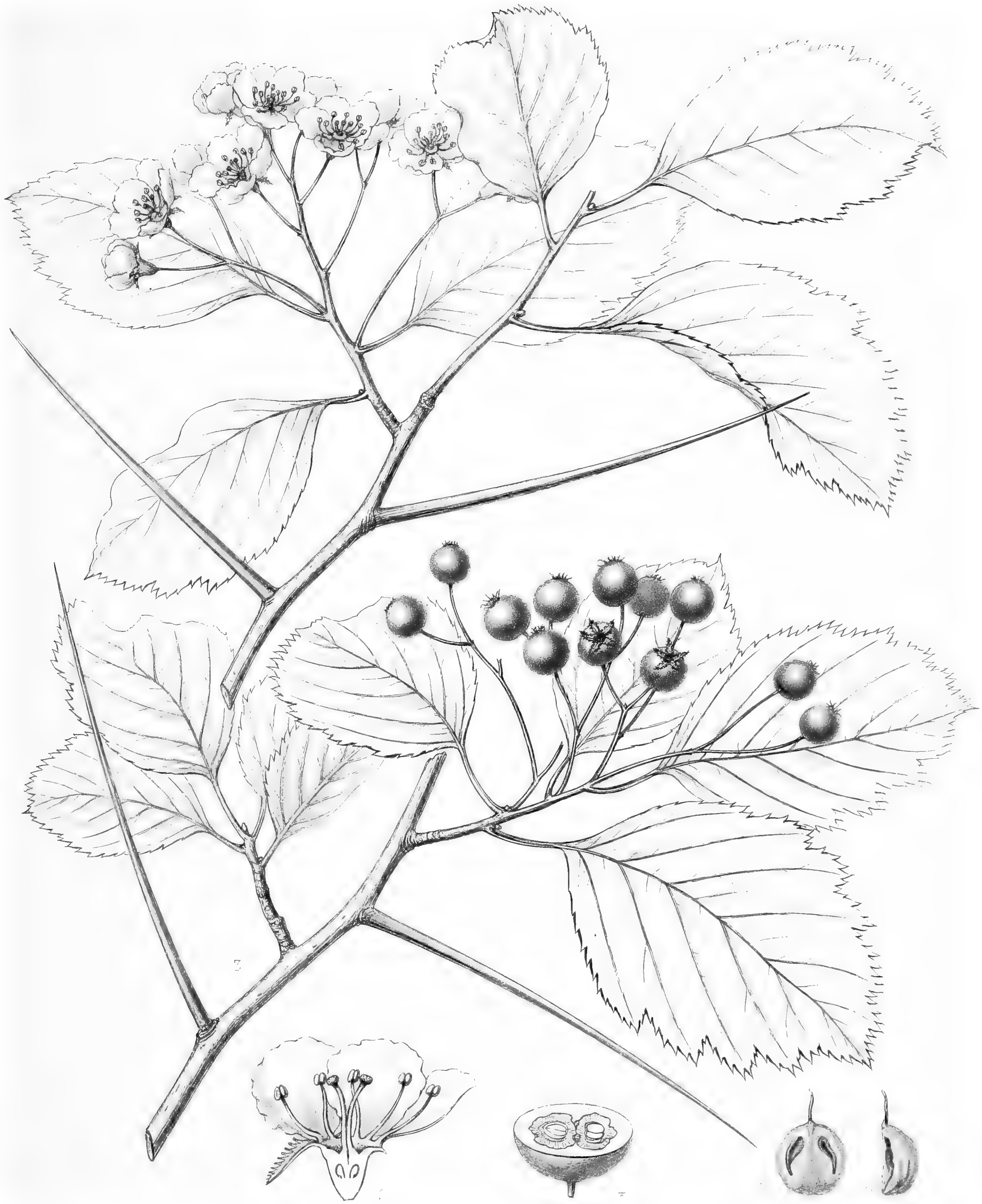
many-fruited usually slightly villose clusters; it is globose, often hairy at the ends until nearly ripe, when it is crimson, very lustrous, and from one quarter to one third of an inch in diameter; the calyx-cavity is broad and shallow, and the lobes, which are much enlarged, are coarsely serrate, reflexed, and persistent; the flesh is thin, dark yellow, dry, and mealy. The two or three nutlets are ridged on the back, with broad high ridges, and are penetrated on each of the inner faces by a deep irregular depression.

Cratægus macracantha is distributed from the valley of the St. Lawrence River in the neighborhood of Montreal through New England, and southward to eastern Pennsylvania and through the region south of the Great Lakes to northern Illinois and southern Wisconsin, growing usually on rich hillsides often in limestone soil, and near the banks of streams.

EXPLANATION OF THE PLATE.

PLATE DCLXXXIX. CRATÆGUS MACRACANTHA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A fruiting branch, natural size.
4. Cross section of a fruit, enlarged.
5. A nutlet, front view, enlarged.
6. A nutlet, side view, enlarged.



C.E.Faxon del. Rapine sc.

CRATÆGUS MACRACANTHA, Kœhne.

A Riocreux direx.t Imp. J. Taneur, Paris.

CRATÆGUS ASHEI.

Haw.

STAMENS 20; anthers yellow. Leaves broadly ovate or obovate, lustrous, dark green, thick, and firm.

Cratægus Ashei, Beadle, *Bot. Gazette*, xxx. 339 (1900).

A tree, rarely more than twenty feet in height, with a slender trunk covered with smooth light gray or red-brown bark which becomes fissured and scaly on old individuals, and stout ascending branches forming a pyramidal or oval head; or often shrubby with numerous stems. The branchlets are slender, somewhat zigzag, marked by small oblong pale lenticels, and armed with straight or slightly curved thin dark red-brown shining spines from an inch to an inch and a half in length; when they first appear they are light red-brown and coated with long pale matted reflexed hairs which gradually disappear, and during their first season they become nearly glabrous, lustrous, and orange-brown or red-brown, and light gray or gray tinged with red during their second season. The leaves are broadly ovate or occasionally obovate, acute, and generally short-pointed at the apex, gradually or abruptly narrowed and cuneate and usually entire at the base, coarsely and occasionally doubly serrate above, with straight or incurved teeth tipped with small dark glands, roughened on the upper surface by short pale hairs and pubescent below, particularly on the thin midribs and slender primary veins; nearly fully grown and membranaceous when the flowers open, at maturity they are thin but firm in texture, dark green and lustrous on the upper surface, pale on the lower surface, and about two inches long and an inch and a half wide. They are borne on stout petioles which are broadly winged above by the decurrent bases of the leaf-blades, glandular, pubescent at first but ultimately nearly glabrous, and about half an inch long. The stipules are narrowly lanceolate, straight or falcate, and glandular-serrate. On vigorous leading shoots the leaves are usually broadly oval or nearly orbicular, rounded or short-pointed at the apex, from two inches and a half to three inches long and from two inches to two inches and a half wide. The flowers, which open early in May and are three quarters of an inch in diameter, are produced in three to ten-flowered simple or compound thin-branched villose corymbs, with large wide conspicuous glandular bracts and bractlets. The calyx-tube is broadly obconic, thickly coated with long matted reflexed white hairs, and the lobes are foliaceous, broad, acute, nearly glabrous on the outer surface, villose on the inner surface, glandular, with small dark long-stalked glands, and strongly reflexed after the petals fall. There are twenty stamens with elongated slender filaments and small yellow anthers, and from three to five styles surrounded at the base by a narrow ring of pale hairs. The fruit, which ripens and falls late in September or in early October, is borne on stout villose or glabrous pedicels, in few-fruited drooping clusters; it is globose or often rather longer than broad, bright red, marked by large scattered dots, more or less villose toward the ends, and about an inch in diameter; the calyx-cavity is broad and deep and the lobes are elongated, coarsely glandular-serrate, erect, and incurved or reflexed; the flesh is thick and yellow. The nutlets, which vary from three to five in number, are deeply grooved and ridged on the back, rather thin, and a third of an inch in length.

Cratægus Ashei inhabits abandoned fields and woods, growing usually on clay soils in the neighborhood of Montgomery, Alabama, where it was first collected in September, 1899, by Mr. C. M. Boynton of the Biltmore Herbarium. It has been named for Mr. W. W. Ashe.[1]

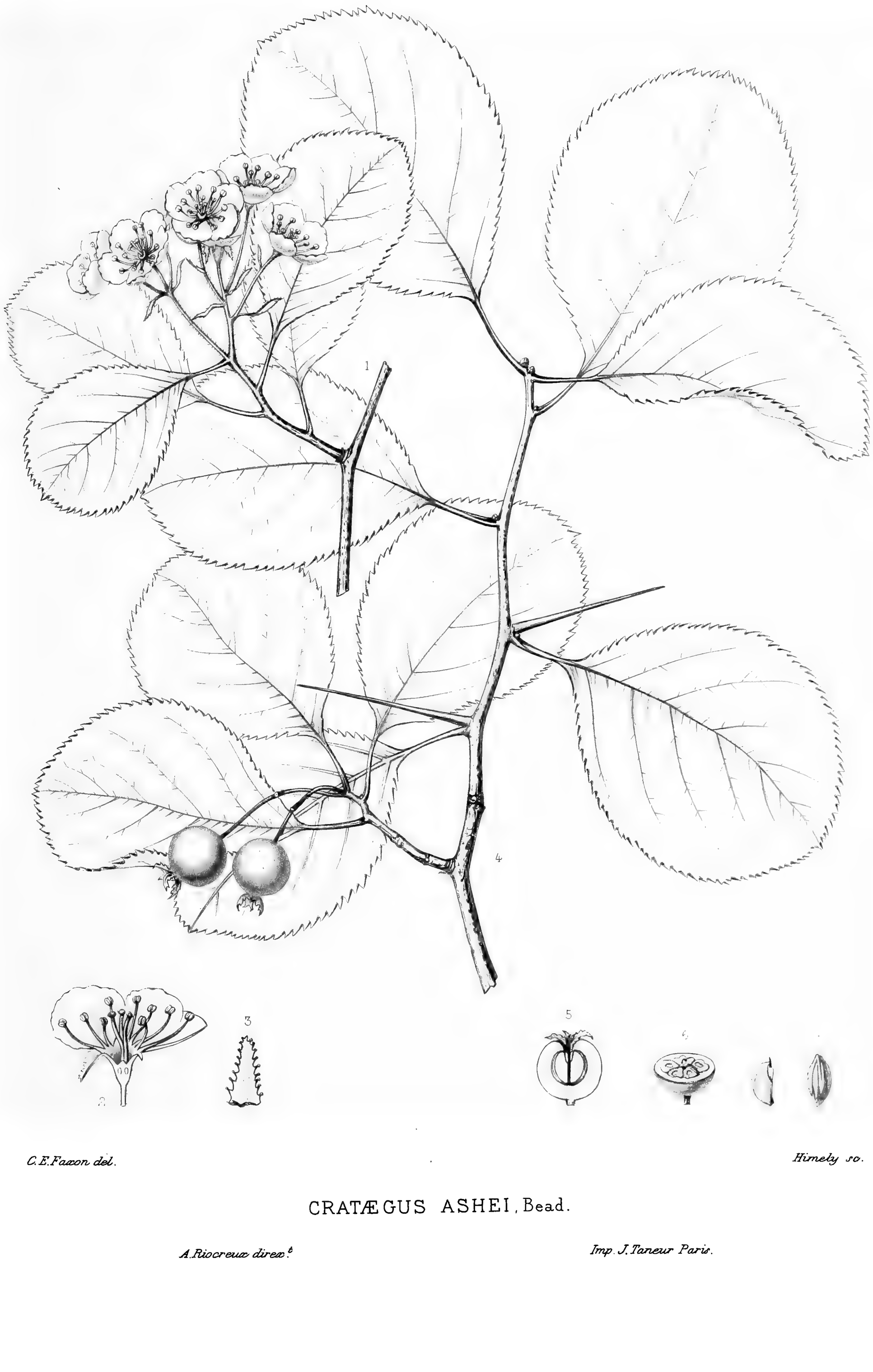
[1] William Willard Ashe (June 4, 1872), a descendant of a family famous in North Carolina during the Revolutionary period, was born in Raleigh, in that state. He was educated at the University of North Carolina, where he was graduated in 1891, and at once

became an assistant in the Geological Survey of the state. The following winter he spent at Cornell University, studying geology and botany, obtaining the degree of Master of Science. The following year Mr. Ashe was appointed forester of the North Carolina Geological Survey, a position which he still holds, and began a study of the Pine lands of the eastern part of that state. He has also become connected with the Forestry Division of the United States Department of Agriculture, and has made numerous journeys, principally through the southern states, for the purpose of examining their forest resources and of studying their flora. Among his numerous publications are papers on *The Forests and Forest Lands of Eastern North Carolina*, *Forest Fires and their Prevention*, *Timber Trees of North Carolina*, and *The Manufacture of Maple Syrup and Sugar*, published in the Bulletins of the North Carolina Geological Survey. He has also published a number of botanical papers, chiefly in the *Journal of the Elisha Mitchell Scientific Society*, in which he has described many species of plants, principally in the genera Panicum and Cratægus.

EXPLANATION OF THE PLATE.

PLATE DCXC. CRATÆGUS ASHEI.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, natural size.
6. Cross section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.



C.E.Faxon del. *Himely sc.*

CRATÆGUS ASHEI, Bead.

A.Riocreux direx.t *Imp. J.Taneur Paris.*

CRATÆGUS HARBISONI.

Haw.

STAMENS 20; anthers light yellow. Leaves oval to obovate, lustrous, subcoriaceous, dark green, and scabrous above.

Cratægus Harbisoni, Beadle, *Bot. Gazette*, xxviii. 413 (1899).— Gattinger, *Fl. Tennessee*, 98.

A tree, sometimes twenty-five feet in height, with a trunk ten or twelve inches in diameter covered with light gray or gray-brown fissured and scaly bark, and often armed with straight or much-branched spines, and stout wide-spreading light gray or reddish branches forming a wide rather open and symmetrical head. The branchlets are slender, nearly straight or occasionally slightly zigzag, marked by large scattered oblong pale lenticels, and furnished with numerous usually stout straight dark red-brown lustrous spines from an inch and a half to two inches in length; when they first appear they are dark red-brown and coated with long spreading white hairs, and during their first summer they are pubescent or glabrous and light reddish brown or orange-brown, becoming light or dark gray during their second year. The leaves are oval or broadly obovate, acute at the apex, cuneate or full and rounded at the entire base, coarsely serrate above, with straight glandular teeth, roughened on the upper surface by stout rigid pale hairs and soft and pubescent below; nearly fully grown early in May when the flowers open, they are then thin, dark yellow-green above and pale below, and in the autumn they are thick and firm in texture, dark green and lustrous on the upper surface, pale on the lower surface, from two inches to two inches and a half long and from an inch to an inch and a half wide, with stout midribs and primary veins deeply impressed on the upper side of the leaf, and conspicuous reticulate veinlets; they are borne on stout villose petioles more or less winged above, furnished like the base of the leaf-blade with numerous large stipitate dark glands, and from one quarter to one half of an inch in length. The stipules are acute, straight or falcate, and conspicuously glandular-serrate. On vigorous leading shoots the leaves are often broadly ovate, cuneate and decurrent below on their stouter petioles, three or four inches long and from two inches and a half to three inches wide, and their stipules are lunate, coarsely glandular-dentate, and frequently half an inch in length. The flowers are three quarters of an inch in diameter, and are produced in broad loose long-branched compound many-flowered villose corymbs, with broad acute glandular-serrate bracts and bractlets. The calyx-tube is broadly obconic, densely villose at the base and glabrous or pubescent above, and the lobes are foliaceous, elongated, gradually narrowed from broad bases, acute, bright green, more or less villose, and coarsely glandular-serrate, with large stipitate dark red glands. There are usually twenty or from ten to twenty stamens with elongated filaments and large light yellow anthers, and from three to five styles. The fruit ripens and falls early in October, and is subglobose but often rather longer than broad, bright red or orange-red, and marked by numerous large dark dots; the calyx is enlarged with a broad shallow cavity and wide-spreading glandular lobes which often fall before the fruit ripens; the flesh is yellow, thick, dry, and mealy. The nutlets vary from three to five in number, and are thin, rounded and sometimes prominently ridged on the back, and about a quarter of an inch in length.

Cratægus Harbisoni inhabits the dry limestone hills and ridges of West Nashville, Tennessee,

where it is common. It has been named for Mr. T. G. Harbison [1] of the Biltmore Herbarium, by whom it was collected in May, 1899.[2]

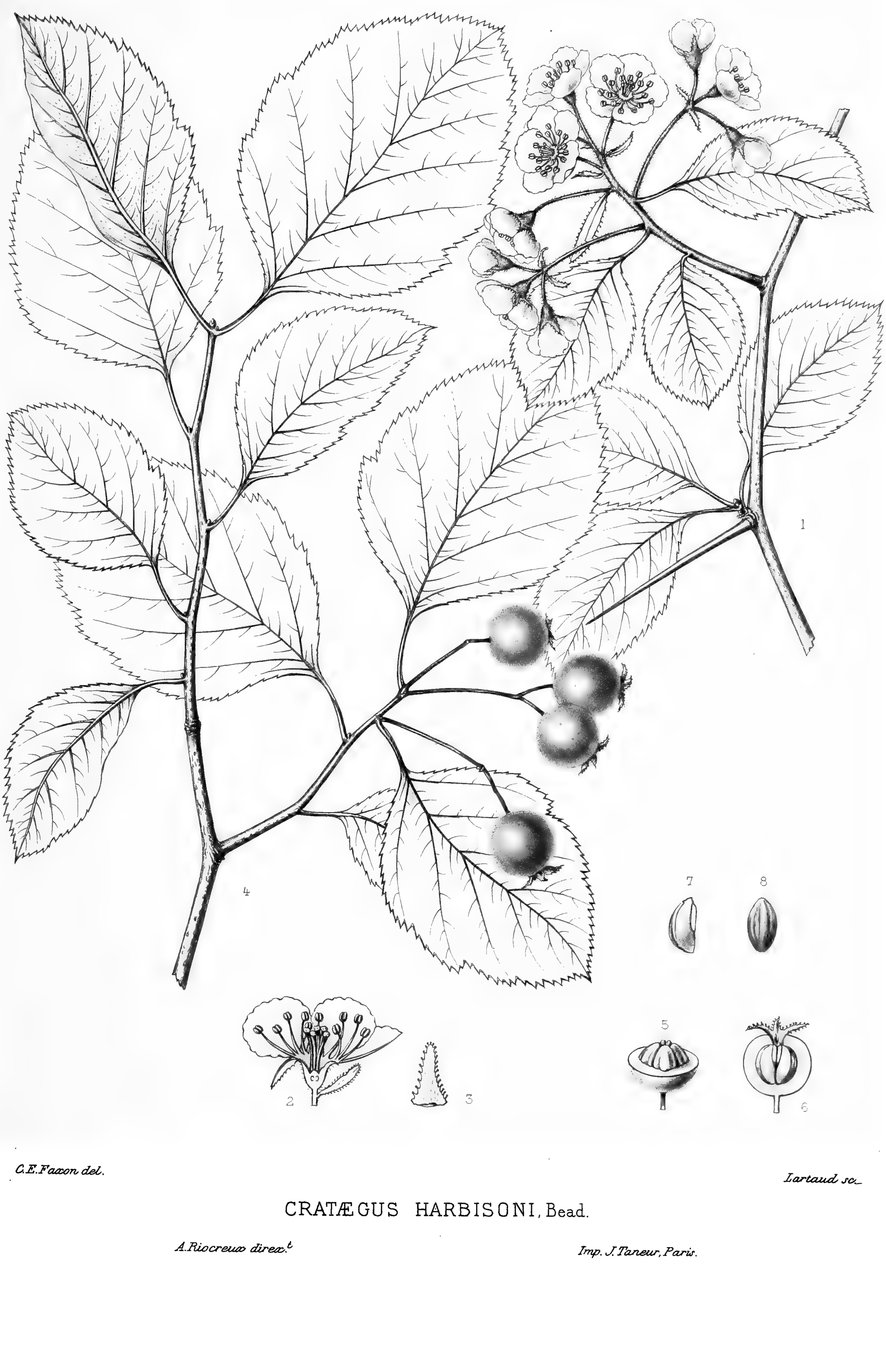
[1] Thomas Grant Harbison (April 23, 1862) was born in Lewisburg, Union County, Pennsylvania, where he attended the public schools and acquired a love for plants from one of his teachers, Mr. C. E. Edmonds, an enthusiastic amateur botanist. After leaving school Mr. Harbison taught in the public schools of Union County for seven years, pursuing at the same time studies in science under a private tutor. In the spring of 1886 he made a botanical tour on foot along the Appalachian Mountains from Pennsylvania to Georgia, and in the autumn of that year settled at Highlands, North Carolina, where for several years he conducted a private school, which was afterwards removed to Waynesville, North Carolina. In the spring of 1897 Mr. Harbison became connected with the herbarium on Mr. George W. Vanderbilt's estate at Biltmore, North Carolina, where he is employed as a botanical collector.

[2] In the Engelmann herbarium there is a specimen of *Cratægus Harbisoni* collected at Nashville in September, 1877, by Dr. A. Gattinger, who was therefore probably the discoverer of this species.

EXPLANATION OF THE PLATE.

PLATE DCXCI. CRATÆGUS HARBISONI.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Cross section of a fruit showing the nutlets, natural size.
6. Vertical section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.



C.E. Faxon del.

Tartaud sc.

CRATÆGUS HARBISONI, Bead.

A. Riocreux direx.t

Imp. J. Taneur, Paris.

CRATÆGUS VAILIÆ.

Haw.

STAMENS 20; anthers yellow. Leaves oval or rarely obovate, acute, coriaceous, dark green, and lustrous.

Cratægus Vailiæ, Britton, *Bull. Torrey Bot. Club*, xxiv. 53 (1897). — Britton & Brown, *Ill. Fl.* ii. 245, f. 2005. — Britton, *Man.* 522. — Gattinger, *Fl. Tennessee*, 100.

A shrub, sometimes eight or nine feet in height, but usually much smaller, with intricately branched stems covered with thin bark which near their base is ashy gray and broken into small plate-like scales. The branchlets are slender, nearly straight, marked by occasional pale lenticels, and armed with numerous thin straight or slightly curved bright chestnut-brown lustrous spines from an inch and a half to two inches and a half in length; dark green and coated with long matted pale hairs when they first appear, they are dark red-brown and puberulous during their first year, and then gradually become dark gray-brown or reddish brown and glabrous. The leaves are oval or rarely obovate, acute, gradually or abruptly narrowed to the entire base, and crenulate-serrate generally only above the middle, with glandular teeth; they are villose on the upper surface and tomentose on the lower surface as they unfold; more than half grown when the flowers open about the middle of May, they are then thin, dark yellow-green, and covered above with short appressed hairs and paler below; and at maturity they are coriaceous, dark green and lustrous on the upper surface, pale yellow-green on the lower surface, from an inch to an inch and a half long and about three quarters of an inch wide, with stout midribs and usually four pairs of primary veins only slightly impressed above and pubescent or puberulous below, and conspicuous reticulate veinlets; they are borne on stout grooved petioles more or less winged toward the apex, at first tomentose but ultimately puberulous, and from an eighth to a quarter of an inch in length. The stipules are narrow-obovate, usually somewhat falcate, very oblique at the base, bright red, coarsely glandular-serrate, about a quarter of an inch long, and caducous. On vigorous leading shoots the leaves often vary from broadly ovate to nearly orbicular, and are generally divided into several short broad acute lobes; they are more coarsely serrate than the leaves of lateral branchlets and are frequently two inches long and broad, with stout midribs often tinged with red on the lower side toward the base, and foliaceous lunate coarsely glandular-serrate stipules sometimes half an inch in length. The flowers are about three quarters of an inch in diameter, and are produced on short stout pedicels in sessile compact simple four or five-flowered tomentose corymbs, with small lanceolate glandular-serrate caducous bracts and bractlets. The calyx-tube is broadly obconic and villose, particularly toward the base, and the lobes are broad, foliaceous, acute, laciniately divided, glandular, with minute dark red glands, glabrous on the outer surface, villose on the inner surface, and reflexed after the flowers open. There are twenty stamens with stout filaments and large pale yellow anthers, and five styles surrounded at the base by a broad ring of hoary tomentum. The fruit, which ripens at the end of September, is borne in erect compact clusters, on short stout villose pedicels, and is subglobose, red sometimes more or less tinged with green, and about a third of an inch in diameter, with thin bright yellow flesh; the calyx is much enlarged, with a broad deep cavity and reflexed persistent glandular-serrate lobes. The five nutlets are thick, rounded, and slightly grooved on the back, and about a quarter of an inch long.

Cratægus Vailiæ, which was long confounded with *Cratægus uniflora*, grows in dry soil along the borders of woods and fields, and is distributed from southwestern Virginia to western North

Carolina, where it is common up to elevations of twenty-five hundred feet above the sea and to eastern Tennessee.

Cratægus Vailiæ was named for Miss Anna Murray Vail,[1] who gathered it in May, 1890, on the banks of the Roanoke River near Roanoke, Virginia.[2]

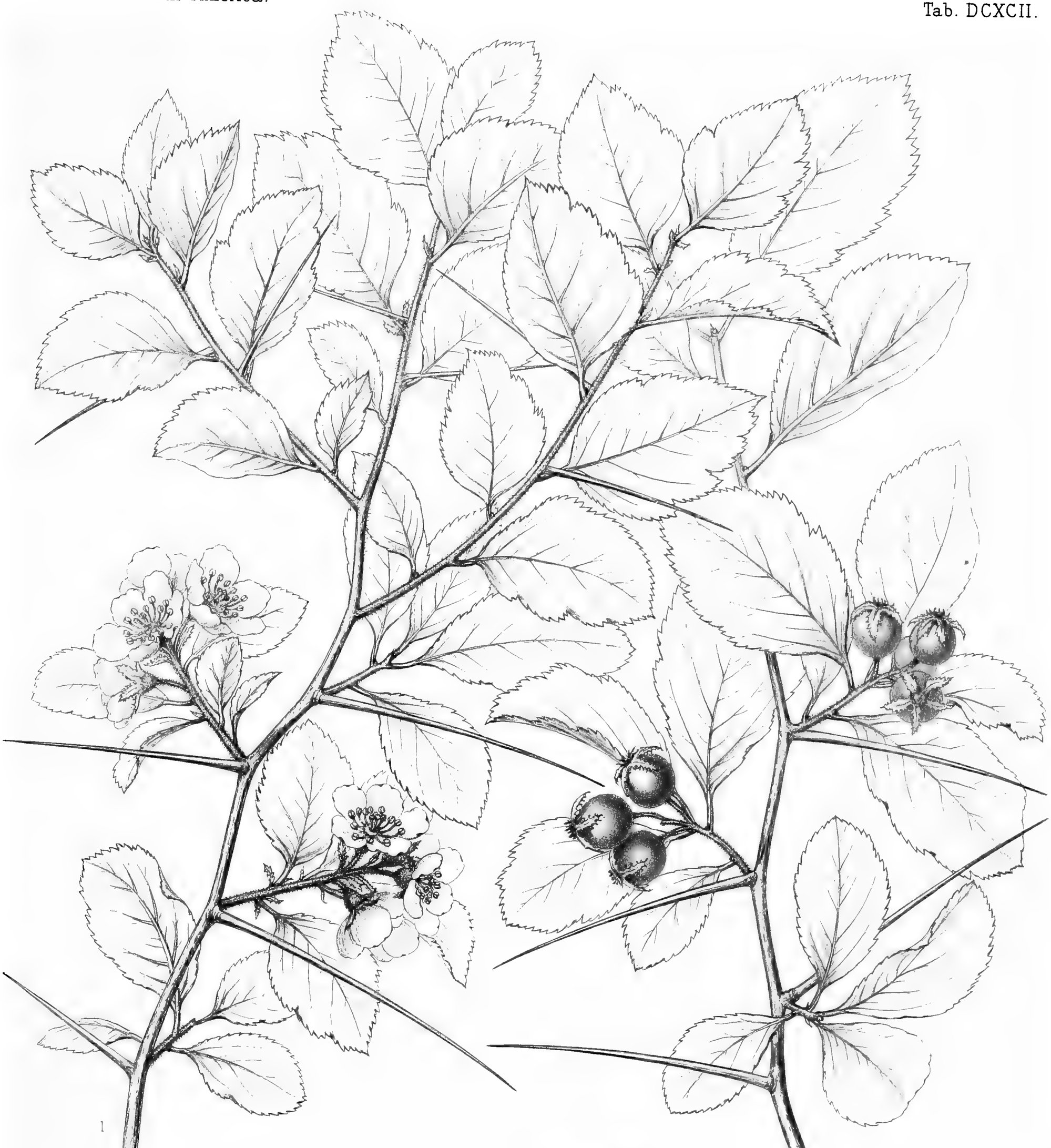
[1] Anna Murray Vail (January 7, 1865), the librarian of the New York Botanical Garden and the author of a number of phytographical papers published in the *Bulletin of the Torrey Botanical Club*, was born in New York, the daughter of David Olyphant Vail, for many years a merchant in China, and through her mother a descendant of the first Patroon of Rensselaerwyck through Hendrick Van Rensselaer of the Greenbush Manor.

[2] The oldest specimen of *Cratægus Vailiæ* that I have seen is preserved in the Gray Herbarium, and was collected by Asa Gray on the French Broad River, probably in 1841 or 1842. This species was gathered by C. E. Faxon at Kittrell's Spring, North Carolina, in 1873; and by C. S. Sargent in September, 1885, on the Little Tennessee River and on Callisaga Creek, North Carolina, in September, 1886.

EXPLANATION OF THE PLATE.

PLATE DCXCII. CRATÆGUS VAILIÆ.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A fruiting branch, natural size.
4. A fruit divided transversely, enlarged.
5. A nutlet, side view, enlarged.



C.E. Faxon del.

Rapine sc.

CRATÆGUS VAILIÆ, Britt.

A. Riocreux direx.t

Imp. J. Taneur, Paris.

CRATÆGUS FLAVA.

Haw.

STAMENS 20; anthers purple. Leaves elliptical to obovate, usually acute, membranaceous, yellow-green.

Cratægus flava, Aiton, *Hort. Kew.* ii. 169 (1789).

A tree, from fifteen to twenty feet in height, with a tall trunk eight or ten inches in diameter covered with thick dark brown bark tinged with red, and deeply divided into narrow rounded ridges, and stout wide-spreading branches forming an open and somewhat irregular head sometimes twenty feet across. The branchlets are slender, slightly zigzag, glabrous, marked by numerous small pale lenticels, and armed with thin nearly straight bright chestnut-brown spines from three quarters of an inch to an inch and a quarter in length; they are dark green deeply tinged with red when they first appear, and dull red-brown or orange-brown during their first season, becoming gradually darker the following year, and ultimately dark gray-brown. The leaves are elliptical or broadly obovate, acute or rarely rounded at the apex, gradually narrowed and cuneate at the base, coarsely and doubly serrate, with broad straight or incurved teeth tipped with large dark red stipitate glands which are also conspicuous on the entire base; when they unfold they are bronze color, villose above with occasional short pale caducous hairs which are most abundant near the base of the midribs, and pubescent below on the midribs and veins; they are about half grown when the flowers open from the tenth to the twentieth of April, and at maturity are membranaceous, yellow-green, usually about two inches long and an inch and a half wide, with slender yellow midribs and three or four pairs of thin primary veins usually puberulous on the under side and only slightly impressed above; they are borne on slender grooved glandular petioles winged often nearly to the base by the decurrent leaf-blades, generally about half an inch long, more or less villose, and after midsummer often light red on the lower side. The stipules are linear, acute, and, like the inner scales of the leaf-buds, bright red and glandular. On vigorous leading shoots the leaves are frequently three inches long and two inches wide, and are sometimes broadly ovate, and three-lobed or divided into two or three pairs of lateral lobes, with petioles which vary from an inch to an inch and a half in length and are broadly winged and conspicuously glandular, and foliaceous lunate or elliptical coarsely glandular-serrate stipules. The flowers are about three quarters of an inch in diameter, and are produced on short slender pedicels, in few-flowered simple or compound slightly villose compact corymbs, with lanceolate acute coarsely glandular-serrate bracts and bractlets which become light red before falling. The calyx-tube is broadly obconic and glabrous, and the lobes are wide, acute, usually laciniately divided, and very glandular. There are twenty stamens with long filaments and large purple anthers, and five styles. The fruit, which ripens early in October and soon falls, is produced in few-fruited drooping clusters; it is oblong, full and rounded at the ends, dark orange-brown, from one half to five eighths of an inch long and from one third to one half of an inch wide; the calyx is prominent, with a long narrow tube and enlarged closely appressed lobes often deciduous before the fruit ripens; the flesh is thick, orange-colored, dry, and mealy. The five nutlets are ridged and deeply grooved on the back, with high narrow ridges, and about a quarter of an inch long.

Cratægus flava grows in dry sandy soil and is now known to me only in the neighborhood of

River Junction, Florida, and on the sand hills of Summerville west of the city of Augusta, Georgia. According to Aiton it was cultivated in London in 1758 by Philip Miller.[1]

[1] Aiton's specimen of *Cratægus flava* is in the British Museum, and although it was made some time after the petals had fallen, it evidently represents the plant which now grows at River Junction and Augusta. Eighty years ago this species was cultivated in Europe, as specimens of cultivated plants in different herbaria show, but I can find no indication of its existence now in any of the European collections of living plants which I have examined. The *Cratægus flava* of authors later than Aiton may be his species, but it is impossible to judge of this from their descriptions. The *Cratægus flava* of Lindley (*Bot. Reg.* xxiii. t. 1939) is evidently not Aiton's species, and is probably the same plant as his *Cratægus flava*, var. *lobata* (*l. c.* t. 1932). This plant, which is not now known to me in a wild state, is still cultivated in the Royal Gardens at Kew. It differs from *Cratægus flava* in its ten stamens and pear-shaped hard green fruits which do not fall until January or February. It is probably this plant which was figured by Loudon as *Cratægus flava*. The plant figured for *Cratægus flava* in the fourth volume of *The Silva of North America* is *Cratægus Floridana*, Sargent.

EXPLANATION OF THE PLATE.

PLATE DCXCIII. CRATÆGUS FLAVA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Cross section of a fruit, natural size.
6. Vertical section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.

C.E.Faxon del.

Lartaud sc.

CRATÆGUS FLAVA, Ait.

A.Riocreux dirext

Imp. J.Taneur, Paris.

CRATÆGUS CONSANGUINEA.

Haw.

STAMENS 20; anthers purple. Leaves obovate or suborbicular.

Cratægus consanguinea, Beadle, *Biltmore Bot. Studies*, i. 34 (1901).

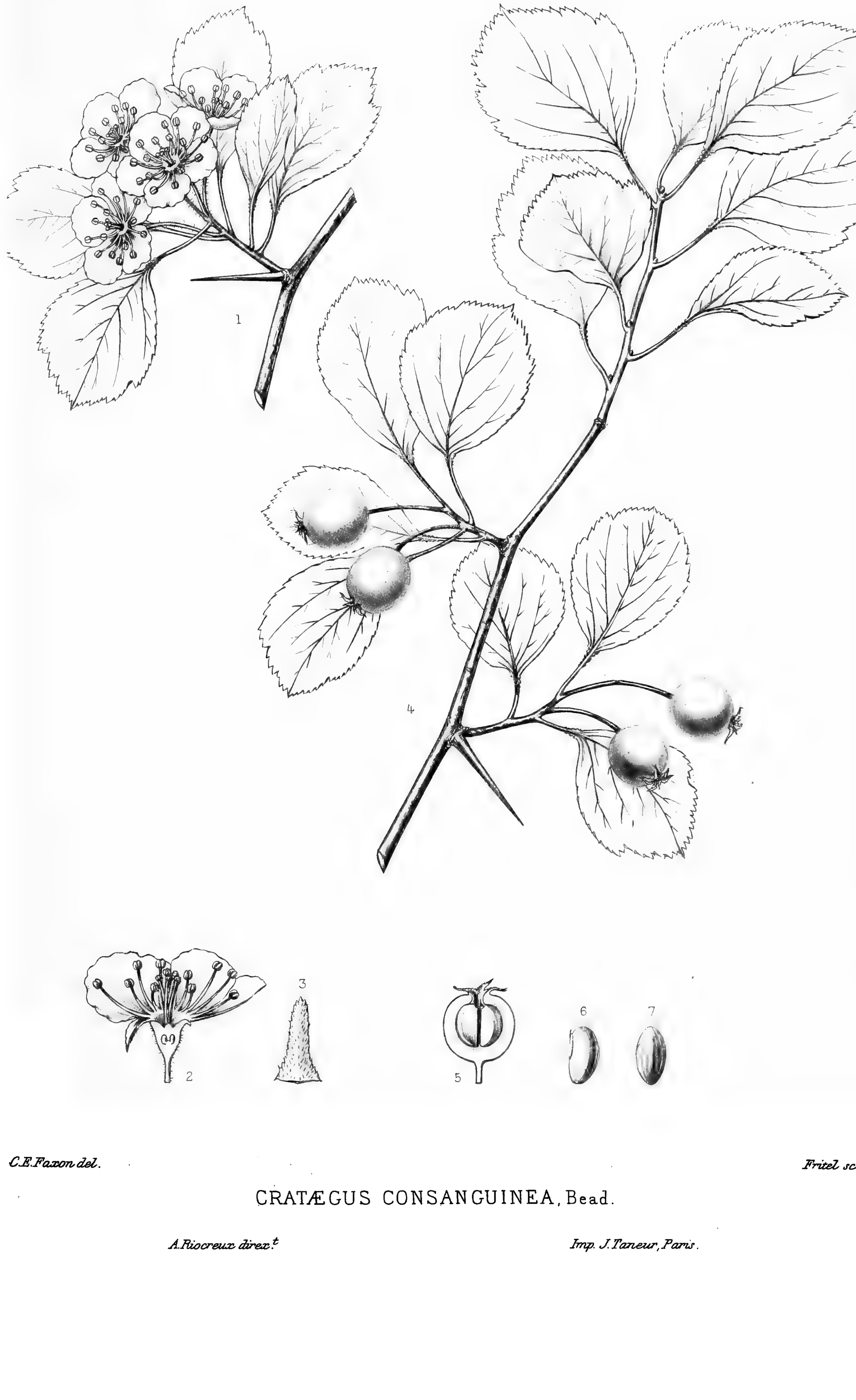
A tree, often twenty feet in height, with a tall trunk six or eight inches in diameter covered with nearly black deeply furrowed bark broken into short thick closely appressed scales, and wide-spreading and often pendulous branches forming a broad symmetrical handsome head. The branchlets are slender, slightly zigzag, marked by small pale lenticels, and armed with short nearly straight gray or chestnut-brown spines varying from one third to three quarters of an inch in length; green more or less tinged with red and covered with pale caducous hairs when they first appear, they soon become bright red-brown and lustrous, and in their second season are dull reddish brown. The leaves are broadly ovate, nearly orbicular, or occasionally oval or rhombic, acute and generally short-pointed at the apex, gradually narrowed and concave-cuneate or sometimes rounded at the entire base, finely and often doubly serrate, with glandular teeth, and frequently irregularly divided above the middle into short acute lobes; nearly fully grown when the flowers open at the end of March or early in April, they are then very thin, blue-green, and slightly villose, particularly along the midribs and veins, and at maturity they are thin but firm in texture, bright green, glabrous with the exception of a few hairs on the under sides of the slender midribs and thin primary veins extending very obliquely toward the apex of the leaf, about an inch in length and from three quarters of an inch to seven eighths of an inch in width, or on vigorous shoots from an inch and a half to two inches long and wide; they are borne on slender grooved glandular petioles broadened above by the gradually narrowed base of the leaf-blades, at first villose, ultimately glabrous, and from one third to three quarters of an inch long. The stipules vary from linear to lunate, and are glandular, often bright red before falling, small, and caducous. The flowers are three quarters of an inch in diameter, and are produced on slender elongated villose pedicels in simple one to five-flowered corymbs, with oblanceolate acuminate bright red caducous bracts and bractlets. The calyx-tube is broadly obconic and sparingly furnished with long pale caducous hairs, and the lobes are gradually narrowed from broad bases, acute, glandular, with minute bright red glands, glabrous, and reflexed after the flowers open. There are twenty stamens with small purple anthers, and from three to five styles surrounded at the base by a narrow ring of short pale hairs. The fruit, which ripens and falls about the middle of September, is borne on slender glabrous pedicels, often only a single fruit of a cluster developing; it is globose or depressed globose, bright red, marked by small dark dots, and nearly half an inch in diameter; the calyx is prominent, with a narrow deep cavity and enlarged appressed lobes; and the flesh is thin, yellow, dry, and mealy. The nutlets vary from three to five in number, and are thick, ridged on the back, with low broad rounded ridges, and about five sixteenths of an inch in length.

Cratægus consanguinea inhabits dry upland Oak woods in western Florida, and is distributed from the neighborhood of Tallahassee to the Appalachicola River. It is very abundant in the neighborhood of River Junction and at Aspalaga, where it was probably first collected in April, 1897, by Dr. A. W. Chapman.

EXPLANATION OF THE PLATE.

PLATE DCXCIV. CRATÆGUS CONSANGUINEA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, enlarged.
6. A nutlet, side view, enlarged.
7. A nutlet, rear view, enlarged.



C.E.Faxon del. *Fritel sc.*

CRATÆGUS CONSANGUINEA, Bead.

A.Riocreux direx.t *Imp. J.Taneur, Paris.*

CRATÆGUS FLORIDANA.

Haw.

STAMENS 20; anthers light yellow. Leaves obovate-cuneate, acute, and often lobed at the apex.

Cratægus Floridana.

Cratægus flava, Sargent, *Silva N. Am.* iv. 113 (in part), t. 189 (not Aiton) (1892).

A tree, rarely more than fifteen feet in height, with a tall straight stem six or eight inches in diameter covered with thick nearly black deeply furrowed bark broken into short thick plate-like scales, and small drooping branches forming a handsome symmetrical head. The branchlets are slender, very conspicuously zigzag, pendulous, and armed with long thin straight spines, or unarmed; when they first appear they are coated with long pale matted hairs which gradually disappear, and during their first summer they are dark red-brown and more or less villose, becoming dull dark brown the following season. The leaves are obovate-cuneate and frequently three-lobed at the apex, with short rounded lobes, gradually narrowed and cuneate at the entire base, finely serrate above, with straight or incurved teeth tipped with showy bright red ultimately dark persistent glands and three-nerved, with slender nerves, and with numerous thin secondary veins and reticulate veinlets; slightly villose above as they unfold, they are nearly fully grown when the flowers open about the middle of March, and are then light yellow-green and glabrous, with the exception of a few mostly persistent hairs along the upper and the lower sides of the nerves and in their axils, and in the autumn they are thick and firm, dark green and lustrous on the upper surface, pale on the lower surface, from an inch to an inch and a half long and about half an inch wide; they are borne on slender tomentose ultimately pubescent or glabrous glandular petioles more or less broadly winged above by the decurrent bases of the leaf-blades, and usually about half an inch long. On vigorous leading shoots the leaves are frequently two inches long and an inch wide, and are sometimes divided by deep rounded sinuses into numerous narrow lateral lobes, and their stipules are lunate, foliaceous, pointed, and coarsely glandular-serrate. The flowers, which are about five eighths of an inch in diameter, are produced in few usually three-flowered simple compact tomentose corymbs, with linear-lanceolate or oblanceolate glandular caducous bracts and bractlets. The calyx-tube is broadly obconic, coated with long matted white hairs, and the lobes are narrow, acuminate, glandular, with bright red stipitate glands, villose toward the base on the outer surface and on the inner surface, and reflexed after the flowers open. There are twenty stamens with small pale yellow anthers, and four or usually five styles surrounded at the base by a broad ring of long shining white hairs. The fruit ripens from the middle to the end of August, and is solitary or in two or three-fruited drooping clusters, on short stout pubescent pedicels; it is obovate, usually about three quarters of an inch in length, bright orange-red, lustrous, and marked by numerous pale dots; the calyx is prominent, with a wide elongated tube, puberulous on the outer surface, and reflexed glandular-serrate lobes; the flesh is thin, yellow, dry, and mealy. The four or five nutlets are rounded and occasionally slightly ridged on the back, and about one third of an inch in length.

Cratægus Floridana inhabits the dry sandy soil of the Pine barrens of northeastern Florida, where it is very abundant in the neighborhood of Jacksonville, and probably extends northward along the coast of Georgia.

Formerly confounded with the *Cratægus flava* of Aiton, *Cratægus Floridana* was figured in the fourth volume of this work for that species.

CRATÆGUS LACRIMATA.

Yellow Haw. Sandhill Haw.

STAMENS 20; anthers yellow. Leaves obovate, round or acute at the apex, subcoriaceous, dark yellow-green, and lustrous.

Cratægus lacrimata, Small, *Torreya*, i. 97 (1901).

A nearly glabrous tree, occasionally twenty but usually not more than ten feet in height, with a tall stem from four to six inches in diameter covered with thick deeply furrowed nearly black bark broken on the surface into thick plate-like closely appressed scales, and long slender drooping branches forming a narrow handsome symmetrical round-topped head. The branchlets are thin, very zigzag, and armed with numerous small nearly straight dark chestnut-brown spines from one half to three quarters of an inch in length; when they first appear they are light orange-brown, soon becoming reddish brown and lustrous, and dark gray-brown in their second year. The leaves are obovate, rounded or acute and glandular-serrate at the apex, usually with incurved teeth, entire and glandular below, gradually narrowed from above the middle to the base, and three-nerved, with slender yellow nerves, and with numerous thin secondary veins and reticulate veinlets; when the flowers open early in April they are nearly fully grown, and are then light yellow and glabrous, with the exception of small tufts of pale caducous hairs on the lower side in the axils of the nerves, and at maturity they are subcoriaceous, yellow-green and lustrous, from one half to three quarters of an inch long and about one third of an inch wide; they are borne on slender grooved petioles which vary from one quarter to one half of an inch in length, and are winged above by the decurrent bases of the leaf-blades, dark orange-brown and at first puberulous, soon become glabrous. The flowers are about two thirds of an inch in diameter, and are produced on short stout pedicels, in from three to five-flowered simple glabrous corymbs, with long linear entire caducous bracts and bractlets which turn red in fading. The calyx-tube is broadly obconic, and the lobes are gradually narrowed from broad bases, acuminate, entire, tipped with large dark glands, and reflexed after the flowers open. There are twenty stamens with slender filaments and large light yellow anthers, and usually three styles surrounded at the base by a narrow ring of pale hairs. The fruit ripens toward the end of August, and is subglobose or short-oblong, full and rounded at the ends, dull brownish yellow marked by occasional large dark dots, and about a third of an inch in diameter, with a prominent elongated calyx-tube and spreading lobes which usually disappear before the fruit ripens; the flesh is thin, yellow, dry, and mealy. The three nutlets are very broad, rounded and sometimes obscurely grooved on the back, about three eighths of an inch long, and usually three in number.

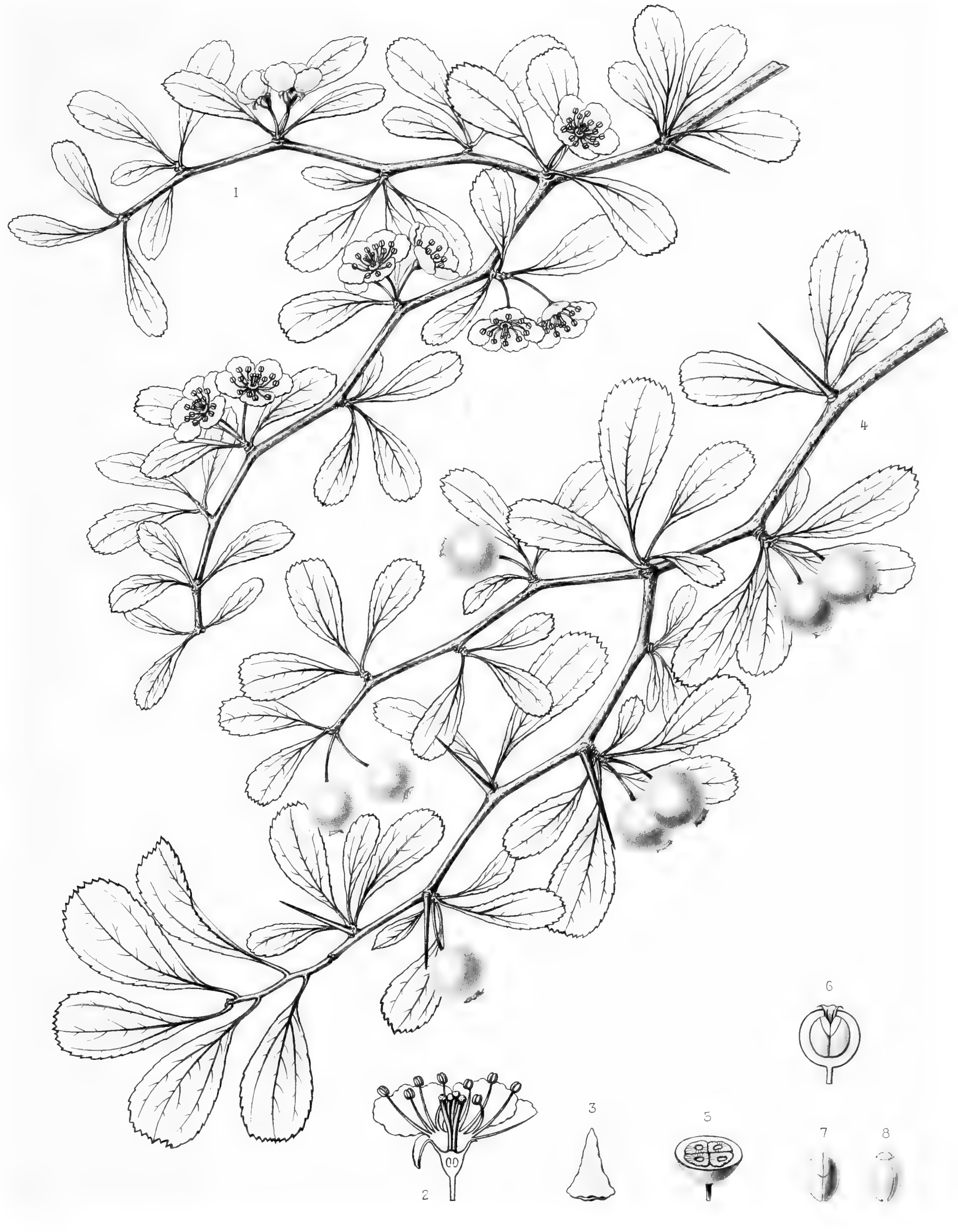
Cratægus lacrimata inhabits western Florida, where it is common and often a conspicuous feature of the vegetation from Pensacola to De Funiak Springs, sometimes growing in moist sand, but more often in dry barrens covered principally with a stunted growth of *Quercus Catesbœi*. It appears to have been first collected at Crest View on May 11, 1898, by Mr. A. H. Curtiss.[1]

[1] See ii. 50.

EXPLANATION OF THE PLATE.

PLATE DCXCV. CRATÆGUS LACRIMATA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Cross section of a fruit, natural size.
6. Vertical section of a fruit, natural size.
7. A nutlet, front view, enlarged.
8. A nutlet, rear view, enlarged.



C.E.Faxon del. *Lartaud sc.*

CRATÆGUS LACRIMATA, Small.

A.Riocreux direx.t *Imp. J.Taneur, Paris.*

CRATÆGUS RAVENELII.

Haw.

STAMENS 20; anthers pale yellow. Leaves obovate, rounded, and abruptly short-pointed or acute at the broad apex.

Cratægus Ravenelii, Sargent, *Bot. Gazette*, xxxiii. 122 (1902).

A tree, twenty-five or thirty feet in height, with a trunk often fourteen or fifteen inches in diameter covered with thick dark brown bark deeply divided into narrow interrupted ridges broken on the surface into short thick plate-like scales, and stout spreading or ascending branches forming a broad open irregular head. The branchlets are stout, somewhat zigzag, and armed with thick straight dull gray-brown spines usually about an inch and a half in length; thickly coated with hoary tomentum when they first appear, they are dark purple or reddish brown and pubescent during their first summer and dark red-brown and glabrous the following season. The leaves are obovate, rounded and abruptly short-pointed or acute at the broad sometimes slightly lobed apex, gradually narrowed from above the middle to the elongated cuneate base, which is more or less undulate on the margins, and coarsely and usually doubly glandular-serrate above, with large bright red ultimately dark persistent glands; they are nearly fully grown when the flowers open about the middle of April, and are then coated with long scattered pale hairs which mostly soon disappear, and at maturity they are thin but firm in texture, yellow-green, scabrous on the upper surface, pale and pubescent on the lower surface along the slender veins, from an inch to an inch and a half long and about three quarters of an inch wide; they are borne on slender glandular petioles winged above by the decurrent bases of the leaf-blades, tomentose at first but ultimately pubescent, and from one quarter to one half of an inch in length. The stipules vary from linear to lunate, and are conspicuously glandular-serrate, tomentose, and caducous. On vigorous leading shoots the leaves are often two inches long and an inch and a half wide, and are frequently divided above the middle into two or three pairs of broad lateral lobes. The flowers are about three quarters of an inch in diameter, in few-flowered simple tomentose corymbs, with linear glandular caducous bracts and bractlets. The calyx-tube is narrowly obconic, thickly coated with long white hairs, and the lobes are lanceolate, villose on the outer surface, glabrous on the inner surface, glandular with small red glands, and reflexed after anthesis. There are twenty stamens with small pale yellow anthers, and five styles surrounded at the base by a broad ring of pale tomentum. The fruit, which ripens early in October, is borne on short thick pedicels, in few-fruited drooping or spreading clusters, and is globose or short-oblong, bright orange-red marked by occasional large dark dots, puberulous at the ends, and from one third to one half of an inch in diameter; the calyx is prominent, with a broad shallow cavity and enlarged spreading and appressed lobes, and the flesh is thick, yellow, and subacid. The five nutlets are ridged on the back, with narrow elevated ridges, pale brown, and a quarter of an inch long.

Cratægus Ravenelii inhabits the sand hills near Aiken, South Carolina, and in Summerville, the western suburb of Augusta, Georgia.

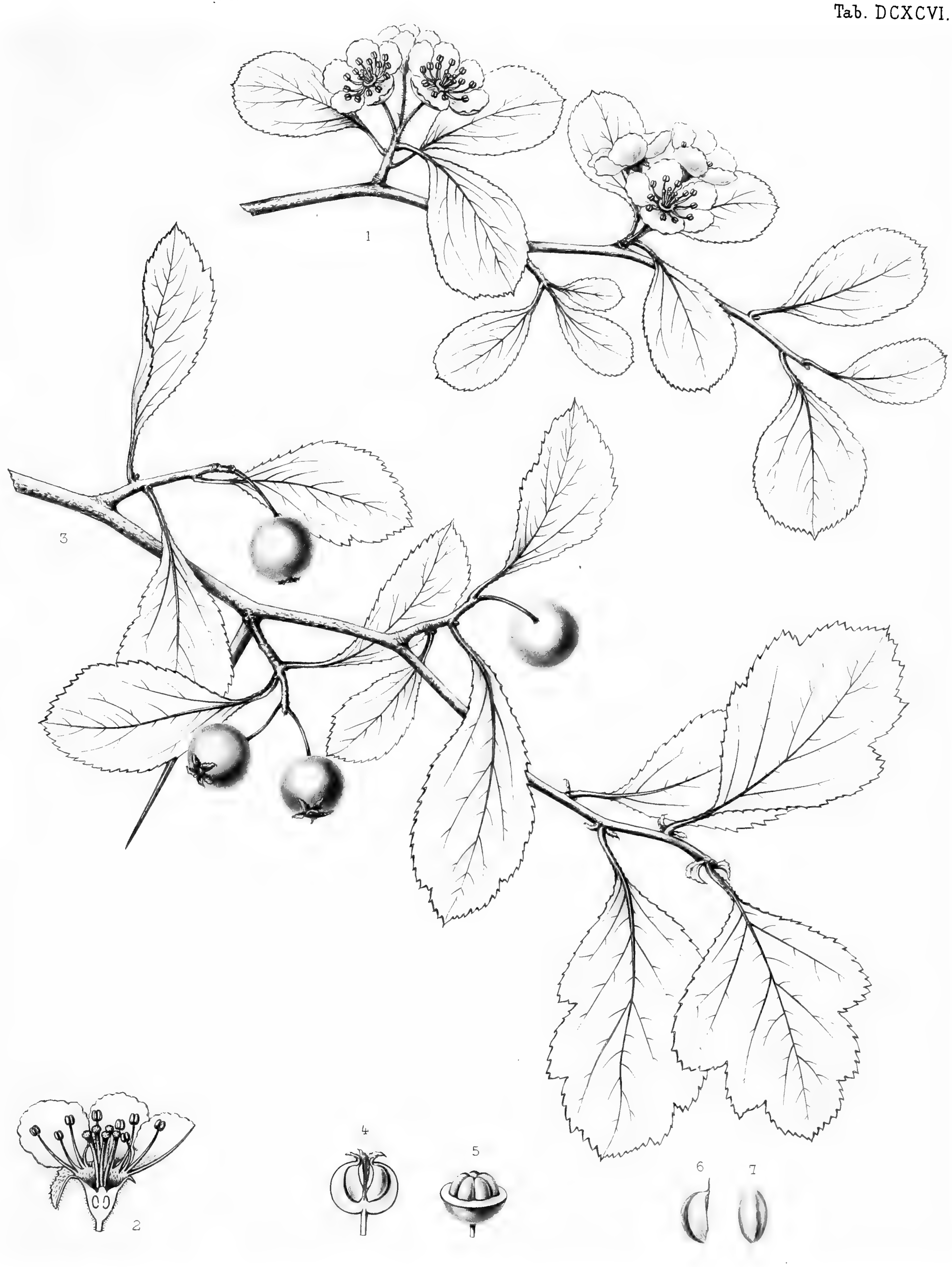
Long confounded with *Cratægus flava* of Aiton, *Cratægus Ravenelii* was collected by William Henry Ravenel[1] as early as 1880, and the name of this distinguished South Carolina botanist may fittingly be associated with this handsome tree.

[1] See viii. 160.

EXPLANATION OF THE PLATE.

PLATE DCXCVI. CRATÆGUS RAVENELII.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A fruiting branch, natural size.
4. Vertical section of a fruit, natural size.
5. Cross section of a fruit showing the nutlets, natural size.
6. A nutlet, side view, enlarged.
7. A nutlet, rear view, enlarged.



C.E.Faxon del.

Lartaud sc.

CRATÆGUS RAVENELII, Sarg.

A.Riocreux direx.t

Imp. J. Taneur, Paris.

CRATÆGUS DISPAR.

Summer Haw.

STAMENS 20; anthers light yellow. Leaves obovate or orbicular, incisely lobed, blue-green.

Cratægus dispar, Beadle, *Biltmore Bot. Studies*, i. 28 (1901).

Cratægus flava, var. **elliptica**, Sargent, *Silva N. Am.* iv. 114 (excl. syn.) t. 190 (1892).

A tree, from twenty to twenty-five feet in height, with a short trunk a foot in diameter, and stout ascending branches forming a broad irregular head; or often shrubby and beginning to flower when only a few feet tall. The bark of the trunk is thin and separates freely into large pale reddish brown or gray-brown scales which in falling disclose the bright red-brown inner bark. The branchlets are stout, zigzag, and armed with thick or thin nearly straight dark red-brown ultimately gray spines from an inch and a half to two inches in length; when they first appear they are coated with thick hoary tomentum, and during their first summer they are dark red-brown and pubescent, becoming darker colored and glabrous the following season. The leaves are usually three-nerved, broadly ovate or orbicular, acute or rounded at the apex, generally narrowed and cuneate or concave-cuneate at the glandular entire base, serrate or doubly serrate above, with straight or incurved glandular teeth, and mostly divided above the middle into several short acute lobes; when they unfold they are coated with long matted snow-white hairs which are more abundant on the lower than on the upper surface, and when the flowers open about the middle of April they are more than half grown, blue-green and villose above and still tomentose below; in the autumn they are thin but firm in texture, blue-green and glabrous on the upper surface, pale and slightly pubescent on the lower surface, particularly along the slender nerves, and usually about an inch long and from three quarters of an inch to an inch wide; they are borne on slender tomentose ultimately pubescent or villose broadly grooved glandular petioles slightly widened above by the decurrent bases of the leaf-blades, and usually about a third of an inch in length. The stipules are lunate, coarsely glandular-serrate, from one sixteenth to one eighth of an inch long, and caducous. On vigorous leading shoots the leaves are broadly ovate or suborbicular, full and rounded at the broad base, coarsely serrate, often deeply divided above the middle into three wide acute lobes, and frequently broader than they are long. The flowers are about five eighths of an inch in diameter, and are produced on slender tomentose pedicels, in simple three to seven-flowered corymbs, with narrow obovate acute glandular bracts and bractlets. The calyx-tube is narrowly obconic, coated with pale tomentum, and the lobes are narrow, acute, glandular-serrate, with minute bright red glands, tomentose on the outer surface, glabrous on the inner surface, and reflexed after the petals fall. There are twenty stamens with small light yellow anthers, and from three to five styles surrounded at the base by a ring of pale tomentum. The fruit ripens late in August or early in September, and is borne on slender pubescent pedicels, in few-fruited clusters; it is subglobose or oblong, light red, puberulous toward the ends, and about a third of an inch in diameter, with a prominent calyx, and thin subacid yellow flesh. The nutlets vary from three to five in number, and are thick, rounded, and obscurely ridged on the back, dark brown, and a quarter of an inch long.[1]

Cratægus dispar grows on the dry sand hills near Aiken and Trenton, South Carolina, and near Augusta, Georgia, where it is very abundant in Summerville its western suburb.

[1] *Cratægus dispar* is one of several species which has long been confounded with *Cratægus flava* of Aiton, and in the fourth volume of this work it appears on plate cxc. as a variety of that species. It is easily distinguished from the species of the flava group which

The fruit is gathered in large quantities and is made into jelly, which can hardly be distinguished from that made in the West Indies from the fruit of the Guava.

grow with it in great quantities near Augusta and Aiken by its blue-green laciniately divided leaves coated while young with snow-white hairs, by its early flowers and early ripening fruit, and by its flaky light red or gray-brown bark which is unlike that of any other species of the flava group.

CRATÆGUS SENTA.

Haw.

STAMENS 20. Leaves obovate to obovate-cuneiform.

Cratægus senta, Beadle, *Bot. Gazette*, xxx. 341 (1900).

Cratægus elliptica, Beadle, *Bot. Gazette*, xxv. 447 (not Aiton) (1898).

A tree, occasionally twenty feet in height, with a short trunk sometimes a foot in diameter covered with deeply furrowed bark, often nearly black near the base of old trees and dark gray above, and stout pendulous or recurved branches forming a broad open irregular head; or more frequently a large shrub with few or numerous stems. The branchlets are slender, zigzag, marked by occasional small pale lenticels, and armed with nearly straight thin bright chestnut-brown ultimately gray spines from three quarters of an inch to an inch and a half in length; when they first appear they are coated with long matted white hairs which gradually disappear, and before the autumn they are rather bright reddish brown and pubescent, growing glabrous and dull red-brown in their second season, and finally dark gray slightly tinged with red. The leaves are obovate or obovate-cuneiform, acute or sometimes rounded and frequently slightly divided into several short acute lobes at the broad apex, gradually narrowed from above the middle to the base, and serrate or doubly serrate, with incurved conspicuously glandular teeth; when they unfold the upper surface is often dark red and is covered with long pale caducous hairs which also occur on the under surface of the midribs and veins, and when the flowers open from the first to the tenth of May they are nearly fully grown, bright yellow-green, and almost glabrous with the exception of the tufts of pale hairs in the axils of the veins, which are mostly persistent through the season; in the autumn they are thin but firm in texture, dark green and lustrous above and paler below, and usually about an inch and a half long and an inch wide, with prominent orange-colored midribs, generally three pairs of slender primary veins extending obliquely to the points of the lobes, and dark conspicuous reticulate veinlets; they are borne on slender deeply grooved glandular petioles which are more or less broadened above by the gradually narrowed bases of the leaf-blades, tomentose at first, ultimately pubescent or nearly glabrous, and about three quarters of an inch in length. The stipules are lanceolate, acuminate, glandular, about an eighth of an inch long, and caducous. On vigorous shoots the leaves are broadly ovate or often nearly orbicular, more deeply lobed than the leaves of fertile branches, with broad rounded or acute lobes, and from two to two and a half inches in diameter, with foliaceous lunate coarsely glandular-dentate stipules sometimes half an inch in length. In the autumn the leaves turn red, yellow, and brown before falling. The flowers, which are about three quarters of an inch in diameter, are produced on slender elongated pedicels coated with long matted pale hairs which cover the branches of the lax compound three to six-flowered corymbs, with lanceolate straight or falcate glandular bracts and bractlets. The calyx-tube is broadly obconic and villose, particularly toward the base, and the lobes are narrow, elongated, acuminate, nearly glabrous, and coarsely and irregularly glandular-serrate. The petals are longer than broad, and there are twenty stamens and from three to five styles surrounded at the base by a broad ring of hoary tomentum. The fruit ripens and falls at the end of September or early in October, and is produced on slender slightly hairy elongated pedicels, in few-fruited drooping clusters; it is globose, bright red, and from one third to one half of an inch in diameter, with a broad deep calyx-cavity, closely appressed calyx-lobes, and dry mealy flesh. The nutlets vary from three to five in number, and are slightly grooved on the back, and about a quarter of an inch in length.

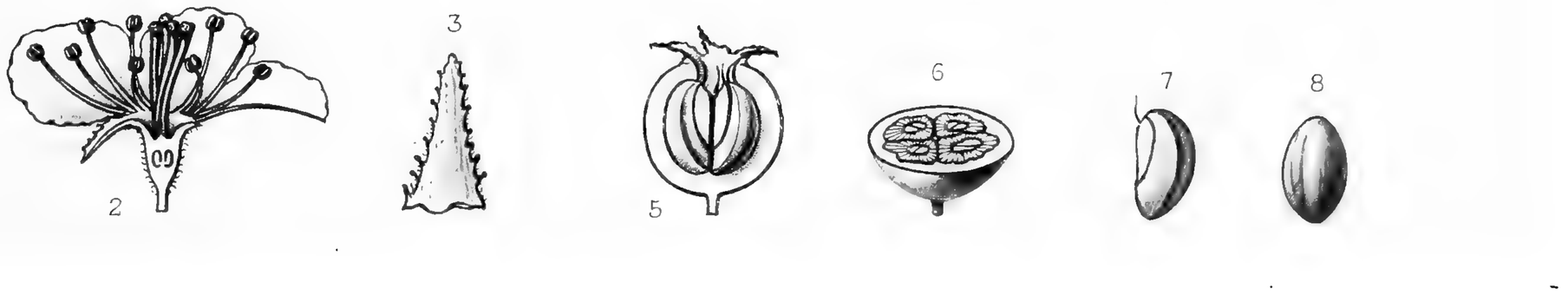
Cratægus senta grows in abandoned fields and in open Oak and Pine woods near Asheville, North Carolina, at elevations of about twenty-two hundred feet above the sea-level, where it was first distinguished by Mr. C. D. Beadle.[1]

[1] What appears to be the same species, judging by the imperfect material which I have seen, grows near Aiken, South Carolina, and on the banks of the Savannah River at Augusta, Georgia.

EXPLANATION OF THE PLATE.

PLATE DCXCVII. CRATÆGUS SENTA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, natural size.
6. Cross section of a fruit, natural size.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.



C.E.Faxon del. *Iartaud sc.*

CRATÆGUS SENTA, Bead.

A.Riocreux direx.t *Imp. J.Taneur, Paris.*

CRATÆGUS APRICA.

Haw.

STAMENS 10; anthers yellow. Leaves obovate to orbicular, subcoriaceous, dark green, and lustrous.

Cratægus aprica, Beadle, *Bot. Gazette*, xxx. 335 (1900). — Gattinger, *Fl. Tennessee*, 99.

A tree, occasionally twenty feet in height, with a stem six or eight inches in diameter covered with deeply furrowed bark broken irregularly into small persistent plate-like scales, and dark gray or on old stems often nearly black, and spreading more or less contorted elongated branches forming a broad open irregular head; or frequently a much-branched shrub with several stout spreading stems. The branchlets are slender, zigzag, marked by many small oblong dark lenticels, and armed with thin nearly straight chestnut-brown spines from an inch to an inch and a half in length; when they first appear they are dark green tinged with red, and villose; soon becoming nearly glabrous, at midsummer they are light orange-brown, dark reddish brown or purple before winter, and ultimately ashy gray. The winter-buds are globose, bright red-brown, and about an eighth of an inch in diameter. The leaves are broadly obovate, oval, or rhomboidal, acute and short-pointed or rounded at the apex, gradually or abruptly narrowed and cuneate at the base, dentate usually only above the middle, with small incurved teeth terminating in conspicuous rose-colored ultimately dark red persistent glands, and often somewhat lobed toward the apex, particularly on vigorous shoots, with short acute lobes; when they first unfold they are of a deep orange color, roughened above by short pale appressed hairs and sparingly villose below, particularly along the slender midribs and remote primary veins, and at maturity they are thick and firm in texture, glabrous, very smooth, dark yellow-green on the upper surface, paler on the lower surface, from an inch to an inch and a quarter long and an inch wide; they are borne on stout grooved conspicuously glandular petioles, which are more or less winged above by the decurrent bases of the leaf-blades, at first villose, ultimately nearly glabrous, usually bright red on the lower side and toward the base after midsummer, and about half an inch long. The stipules are linear or linear-lanceolate, acute, and glandular-serrate. On vigorous leading shoots the leaves are often nearly orbicular, more frequently and more deeply lobed than the leaves of lateral branchlets, and from an inch and a half to two inches long and wide, with stout broad-margined petioles and foliaceous lunate stipules. The flowers, which open about the tenth of May, when the leaves are nearly fully grown, are three quarters of an inch in diameter, and are produced on slender pedicels, in small three to six-flowered villose nearly sessile corymbs. The calyx-tube is broadly obconic, villose at the base, glabrous above, and the lobes are gradually narrowed from broad bases, acuminate, glabrous, coarsely glandular-serrate, and reflexed after the flowers open. There are ten stamens with short slender filaments and small bright yellow anthers, and from three to five styles surrounded at the base by a narrow ring of pale hairs. The fruit ripens late in the autumn, and is borne on stout glabrous or slightly villose pedicels from one quarter to one half of an inch in length, in erect or drooping usually two or three-fruited clusters; it is subglobose, rarely rather longer than broad, dull orange-red, often slightly villose at the ends, and marked by numerous small dark dots; the calyx is much enlarged, with a broad prominent deep tube and wide-spreading coarsely glandular acuminate lobes which are bright red at the base on the upper side; the flesh is thin, light yellow, sweet, and rather juicy. The nutlets, which are large in proportion to the size of the fruit, vary from three to five in

number, and are light-colored, about a quarter of an inch long, and rounded and ridged on the back, with a broad low ridge.

Cratægus aprica inhabits dry woods in the foothill region of the southern Appalachian Mountains, where it is common from southwestern Virginia through western North Carolina to eastern Tennessee, northern Georgia, and Alabama, growing usually at elevations between fifteen hundred feet and thirty-five hundred feet above the sea-level.

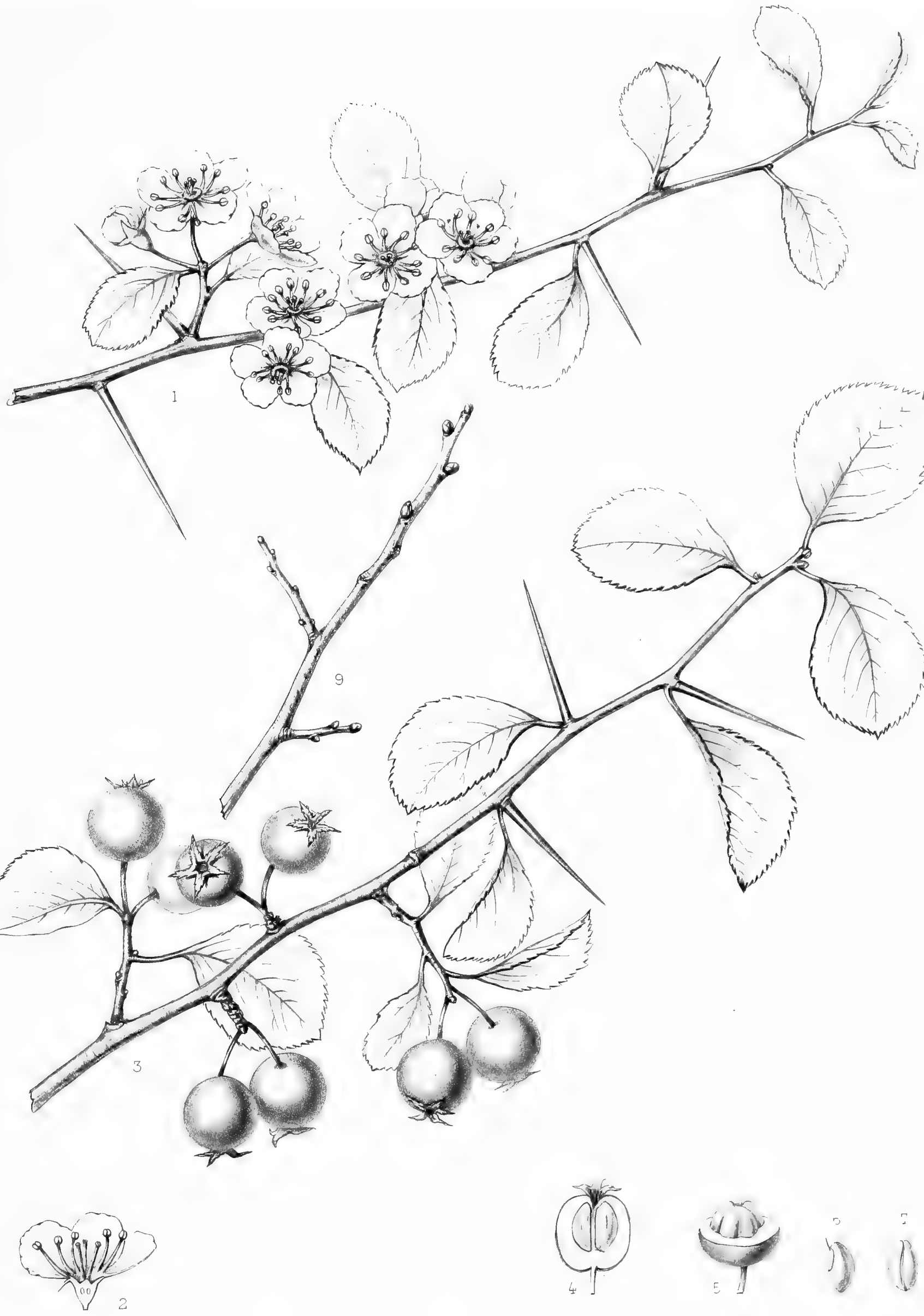
Long confounded with *Cratægus flava* of Aiton, its true characters were first made known by Mr. C. D. Beadle of the Biltmore herbarium. Since 1876 *Cratægus aprica* has inhabited the Arnold Arboretum, where it is perfectly hardy and produces its flowers and fruit in the greatest abundance.[1]

[1] In the Arnold Arboretum this tree was raised from seeds given to me by Dr. Asa Gray under the name of *Cratægus uniflora*, and without any indication of its origin. One of the most distinct and interesting species in the collection and the only representative of the flava group which has proved hardy in the northern states, *Cratægus aprica* is particularly beautiful in the Arboretum late in October and in early November, when the long branches are loaded with their abundant fruits, and the leaves turn to a deep purple color.

EXPLANATION OF THE PLATE.

PLATE DCXCVIII. CRATÆGUS APRICA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A fruiting branch, natural size.
4. Vertical section of a fruit, natural size.
5. Cross section of a fruit showing the nutlets, natural size.
6. A nutlet, side view, enlarged.
7. A nutlet, rear view, enlarged.
8. A nutlet, front view, enlarged.
9. A winter branchlet, natural size.



C. E. Faxon del. Lantaud sc.

CRATÆGUS APRICA, Bead.

A. Riocreux direct.t Imp. J. Taneur, Paris.

CRATÆGUS OPIMA.

Haw.

STAMENS 20; anthers purple. Leaves oval to ovate or nearly orbicular, acute, membranaceous, bright green.

Cratægus opima, Beadle, *Biltmore Bot. Studies*, i. 40 (1901).

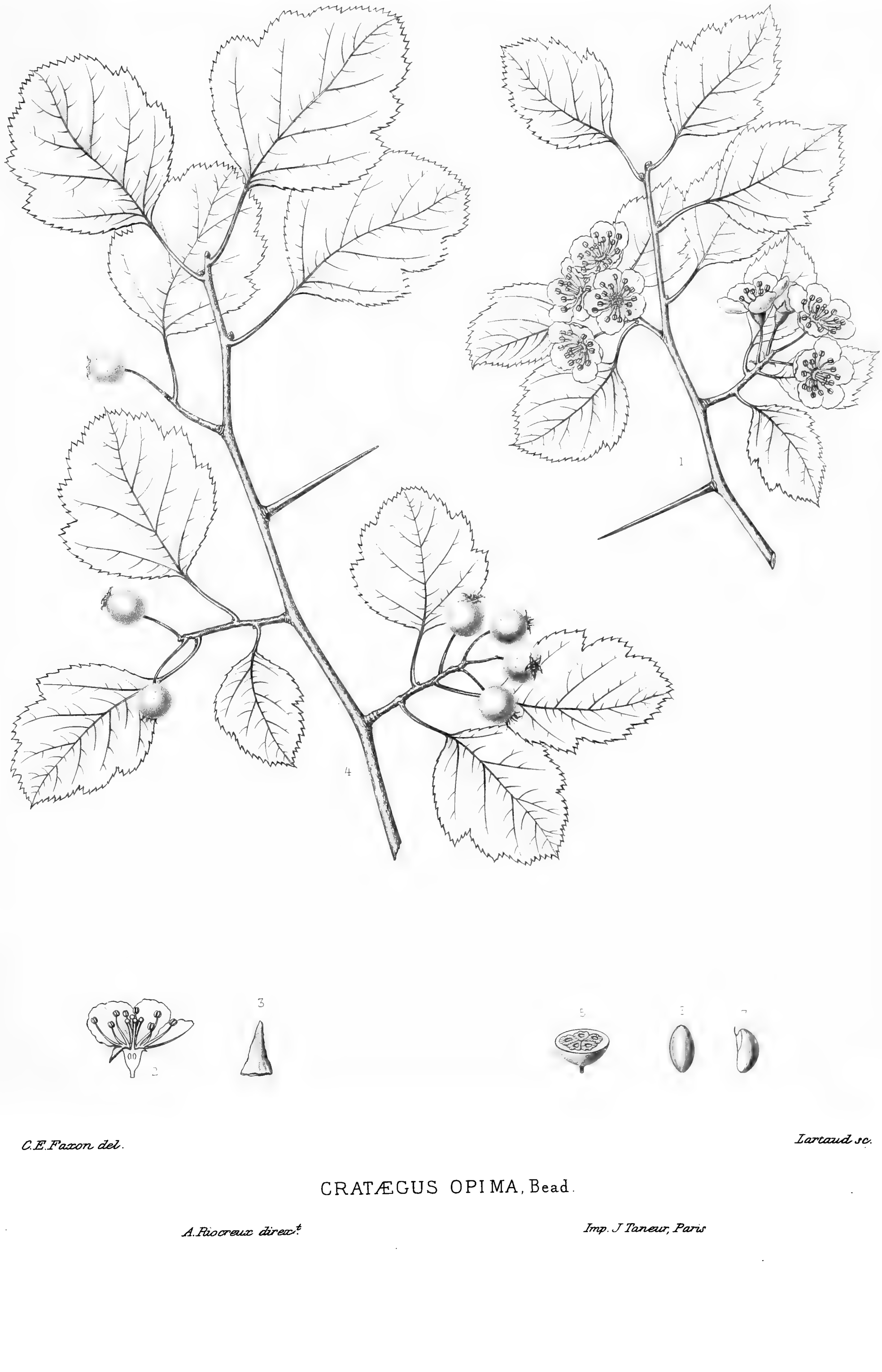
A nearly glabrous tree, from twenty to twenty-five feet in height, with a tall slender often spiny stem covered with ashy gray bark generally blackened near the base of old trunks, and spreading or ascending branches forming a round or oval usually open head. The branchlets are small, nearly straight, marked by minute pale lenticels, and armed with numerous thin nearly straight bright chestnut-brown lustrous spines from an inch to an inch and a half in length; green more or less tinged with red when they first appear, they soon become bright red-brown, and during their second season grow gray tinged with red or brown. The leaves vary from oval to ovate or to nearly orbicular, and are acute at the apex, gradually or abruptly narrowed and cuneate at the entire base, finely serrate above, with incurved teeth, and usually divided above the middle into several short acute acuminate or rounded lobes; they are half grown when the flowers open about the middle of April, and are then glabrous with the exception of a few short caducous hairs along the midribs and veins, which are most abundant on the upper side; and at maturity they are thin but firm in texture, light green on the upper surface, pale on the lower surface, about an inch and a half long and an inch and a quarter wide, with slender midribs only slightly impressed above, and five or six pairs of arcuate primary veins spreading to the points of the lobes; they are borne on very slender grooved glandular petioles narrowly winged at the apex by the decurrent bases of the leaf-blades, and usually about three quarters of an inch in length. The stipules are linear, straight or falcate, glandular-serrate, and caducous. On vigorous leading shoots the leaves are sometimes rounded or nearly truncate at the base, and from an inch and a half to two inches long and broad. The flowers are about two thirds of an inch in diameter, and are produced on short slender pedicels, in compact few-flowered thin-branched compound corymbs, with linear glandular bracts and bractlets. The calyx-tube is broadly obconic and glabrous, and the lobes are gradually narrowed from broad bases, acute, entire, or sparingly glandular-serrate, tipped with dark red glands, puberulous on the inner surface, and reflexed after the flowers open. There are twenty stamens with purple anthers, and from three to five styles surrounded at the base by a narrow ring of snowy white tomentum. The fruit is borne on short stout pedicels, in compact few-fruited erect or drooping clusters, and, ripening about the first of October, hangs on the branches for several weeks before falling; it is subglobose but often rather longer than it is wide, bright red, and about a quarter of an inch in diameter; the calyx is prominent, with a well-developed tube, a broad deep cavity, and much enlarged closely appressed lobes which often fall with the tube before the fruit becomes entirely ripe; the flesh is thin, yellow, dry, and mealy. The nutlets vary from three to five in number, and are thin, slightly grooved and ridged on the back, and an eighth of an inch in length.

Cratægus opima is abundant in the neighborhood of Greenville, Alabama, where it grows in open woods in clay soil and where it was discovered in April, 1900, by Mr. C. L. Boynton.

EXPLANATION OF THE PLATE.

PLATE DCXCIX. CRATÆGUS OPIMA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Cross section of a fruit, natural size.
6. A nutlet, rear view, enlarged.
7. A nutlet, side view, enlarged.



C.E. Faxon del.

Lartaud sc.

CRATÆGUS OPIMA, Bead.

A. Riocreux dirext.

Imp. J Taneur, Paris

CRATÆGUS VULSA.

Haw.

STAMENS 20; anthers pale yellow. Leaves oval or ovate, acute, membranaceous, bright green.

Cratægus vulsa, Beadle, *Biltmore Bot. Studies*, i. 39 (1901).

A nearly glabrous tree, occasionally twenty feet in height, with a tall stem five or six inches in diameter covered with thin fissured bark broken on the surface into light gray scales tinged with brown, and often armed with long compound spines, and ascending or spreading branches forming an oval usually compact symmetrical head; or sometimes a shrub with numerous stems. The branchlets are slender, nearly straight, marked by small scattered pale lenticels, and armed with thin nearly straight bright chestnut-brown shining spines from an inch to an inch and a half in length; dark yellow-green and glabrous when they first appear, they are bright reddish brown and lustrous during their first season, and light gray-brown in their second year. The leaves are oval or ovate, acute at the apex, full and rounded or broadly cuneate at the entire base, irregularly and often doubly serrate above, with straight or incurved gland-tipped teeth, and often divided into several short acute lateral lobes; as they unfold they are dark bronze-red and pilose, with scattered caducous hairs, and furnished with tufts of pale often persistent hairs in the axils of the principal veins; they are nearly fully grown when the flowers open late in April, and at maturity they are thin, bright green on the upper surface, paler on the lower surface, about two inches long and an inch and a half wide, with slender midribs and four or five pairs of thin pale yellow primary veins; they are borne on slender grooved petioles somewhat villose at first but soon glabrous, and about three quarters of an inch in length. The stipules are linear, straight, or falcate, finely glandular-serrate, and turn bright red in fading. On vigorous leading shoots the leaves are broadly ovate, acute, or acuminate, full and rounded or occasionally truncate or broadly cuneate at the base, more coarsely dentate and more deeply lobed than the leaves of lateral branchlets, and often three inches long and two inches and a half wide, with stout winged often glandular petioles and narrow falcate acuminate glandular stipules. In the autumn before falling the leaves turn yellow or brown. The flowers are three quarters of an inch in diameter, and are produced on slender pedicels in compact compound three to ten-flowered corymbs, with linear acuminate glandular red bracts and bractlets. The calyx-tube is broadly obconic and the lobes are gradually narrowed from broad bases, acuminate, and entire or occasionally obscurely serrate toward the apex. There are twenty stamens with small pale yellow anthers, and from three to five styles surrounded at the base by a thin ring of pale hairs. The fruit ripens at the end of September or early in October, and is borne on slender pedicels, in few-fruited drooping clusters; it is globose, yellow-green flushed with red, and a third of an inch in diameter; the calyx is prominent, with a well-developed tube, a broad and comparatively deep cavity, and closely appressed lobes; the flesh is yellow-green, thin, dry, and mealy. The nutlets vary from three to five in number, and are thin, rounded, and sometimes slightly ridged and grooved on the back, and about three sixteenths of an inch in length.

Cratægus vulsa grows in rich moist soil on the borders of Horseleg Creek at Rome, Georgia, and in the low flat woods in the neighborhood of Gadsden on the Coosa River in northeastern Alabama, where it was discovered in the spring of 1899 by Mr. C. L. Boynton.

EXPLANATION OF THE PLATE.

PLATE DCC. CRATÆGUS VULSA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, natural size.
6. Cross section of a fruit, natural size.
7. A nutlet, rear view, enlarged.
8. A nutlet, side view, enlarged.
9. A leaf of a vigorous shoot, natural size.

C.E. Faxon del. *Lartaud sc.*

CRATÆGUS VULSA, Bead.

A. Riocreux direx.t *Imp. J. Taneur, Paris.*

CRATÆGUS GLABRIUSCULA.

Haw.

STAMENS 20; anthers white. Leaves oblong-ovate to semiorbicular, subcoriaceous, dark green, and lustrous.

Cratægus glabriuscula, Sargent, *Bot. Gazette*, xxxi. 235 (1901).

A tree, from twenty to twenty-five feet in height, with a tall straight stem often a foot in diameter covered with thin dark brown scaly bark, and long ascending branches forming a narrow head. The branchlets are slender, nearly straight or rarely somewhat zigzag, marked by numerous small pale lenticels, and unarmed or furnished with occasional very thin straight chestnut-brown lustrous spines generally from three quarters of an inch to an inch in length. The leaves vary from oblong-ovate to semiorbicular, and are acute and often short-pointed or rarely rounded at the apex, gradually narrowed from below the middle and decurrent on the long slender slightly grooved glandular petioles, coarsely and often doubly serrate usually only above the middle, with broad straight gland-tipped teeth, and sometimes divided toward the apex into two or three short acute lobes; when the flowers open about the first of April they are nearly fully grown, and are membranaceous and slightly pilose above, with scattered pale hairs which are most abundant along the base of the midribs and soon disappear; and at maturity they are subcoriaceous, hard, and firm in texture, dark green and lustrous on the upper surface, pale on the lower surface, from an inch and a half to two inches long and from three quarters of an inch to an inch wide, with thin light yellow midribs and primary veins extending obliquely toward the apex of the leaf and conspicuous secondary veins and reticulated veinlets. The stipules are linear, entire, and about a third of an inch in length. On vigorous leading shoots the leaves are often ovate, broadly cuneate at the base, much more coarsely dentate and more frequently lobed than the leaves of lateral branchlets, and from two inches to two inches and a half long and wide, with foliaceous lunate coarsely glandular-dentate stipules sometimes an inch broad. The flowers, which are about half an inch in diameter, are borne on long slender pedicels, in few-flowered rather compact thin-branched corymbs, with minute linear finely glandular-serrate caducous bracts and bractlets. The calyx-tube is broadly obconic, and the lobes are short, gradually narrowed from broad bases, acute, entire, villose on the upper surface, and reflexed after the flowers open. There are twenty stamens with elongated filaments and nearly white anthers, and five styles. The fruit, which ripens in September and often does not fall until late in the winter, hangs on slender stems in compact many-fruited drooping clusters; it varies from short-oblong to obovate or to nearly globose, and is dull orange color marked by minute dark dots, and about a quarter of an inch long; the calyx is conspicuous, with a deep broad cavity and spreading or closely appressed lobes which are but slightly enlarged, dull red on the upper side at the base, and often deciduous before the fruit ripens; the flesh is very thin, yellow, dry, and hard. The five nutlets are rounded and sometimes obscurely grooved on the back, and about three sixteenths of an inch long.

Cratægus glabriuscula inhabits the dry parts of the bottom-lands of the Trinity River and its branches near Dallas, Texas, where it grows in forests of *Ulmus crassifolia* and *Celtis Mississippiensis*, and where it was discovered in June, 1899, by Mr. Julien Reverchon.[1]

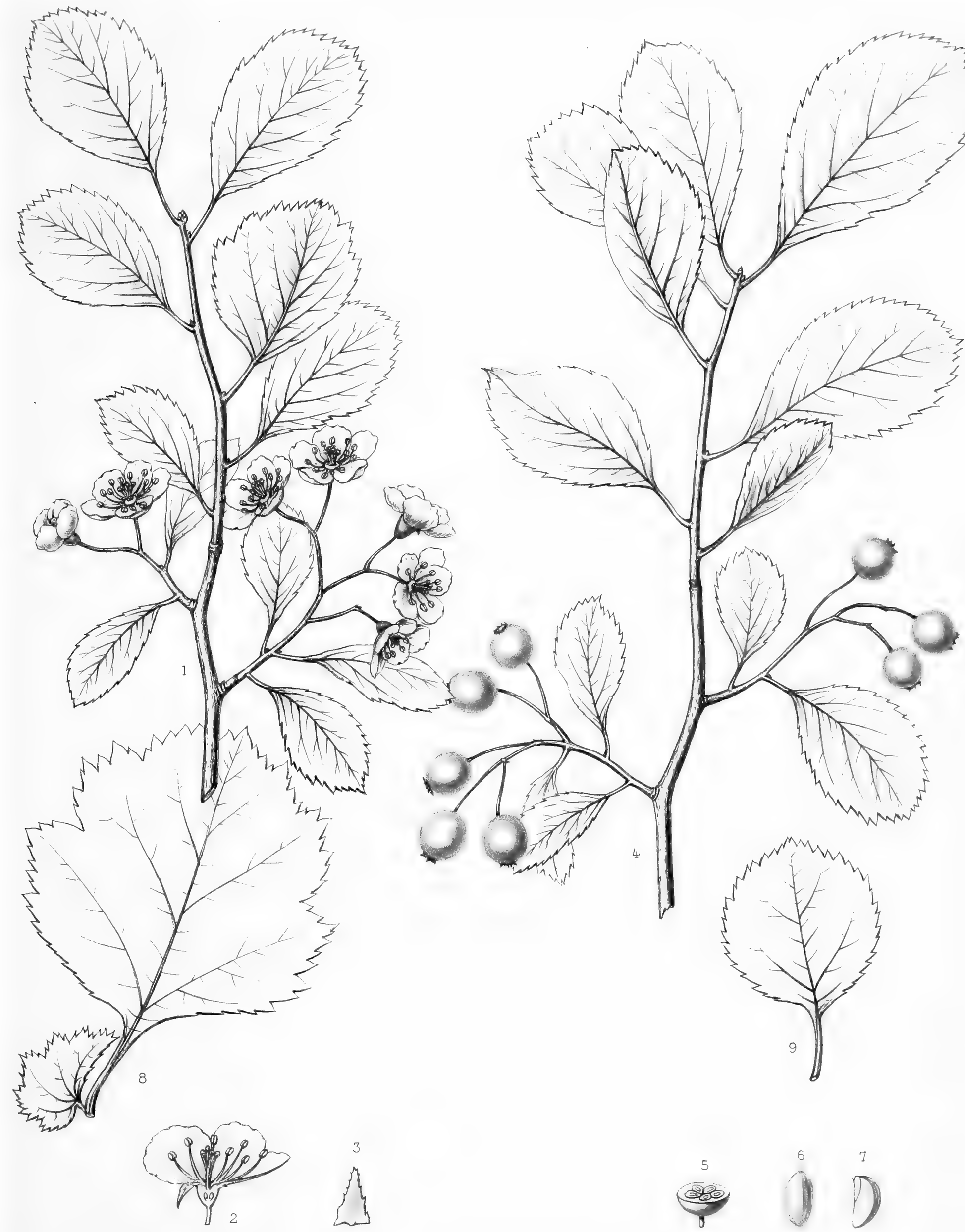
[1] Julien Reverchon (August 3, 1837) was born in the little village of Diemoz near Lyons in France, of a family well known for its strong republican principles, his grandfather Jacques Reverchon having been a member of the convention which framed the constitution of the first French Republic, and his father and uncle active participants in the Revolution of 1848. In 1855 he came with his father to Texas, where the family purchased a farm in the neighborhood of Dallas. Here he was able to turn the knowledge of botany

which he had acquired in his native village as a boy to good use in making large collections of the then little known plants growing in the neighborhood of his home. These brought him the correspondence of Asa Gray and other botanists, who induced him to extend his botanical excursions, and in 1885 he was able to devote several months to exploring a part of southwestern Texas which had not been previously visited by botanists. After this journey, rich in many discoveries, his profitable dairy farm kept him at home for several years, but now relieved from the cares of business, Mr. Reverchon has recommenced botanical work and is devoting himself to collecting the still imperfectly known plants of eastern Texas. *Reverchonia*, a genus of the Euphorbia family, was named in his honor by Asa Gray, and the name of Reverchon is also associated with the flora of his adopted state in species of Gyrostachys, Andrachne, Aristida, Muehlenbergia, Panicum, Vicia, Hedeoma, Campanula, Psoralea, Petalostemon, and Astragalus, discovered by him.

EXPLANATION OF THE PLATE.

PLATE DCCI. CRATÆGUS GLABRIUSCULA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Cross section of a fruit, natural size.
6. A nutlet, rear view, enlarged.
7. A nutlet, side view, enlarged.
8. Leaf of a shoot with a stipule, natural size.
9. A leaf, natural size.



C.E.Faxon del.

Rapine sc.

CRATÆGUS GLABRIUSCULA, Sarg.

A.Riocreux direx.t

Imp. J.Taneur, Paris.

CRATÆGUS BLANDA.

Haw.

STAMENS 20; anthers canary-yellow. Leaves oval to rhombic, acute, or acuminate.

Cratægus blanda, Sargent, *Bot. Gazette*, xxxiii. 121 (1902).

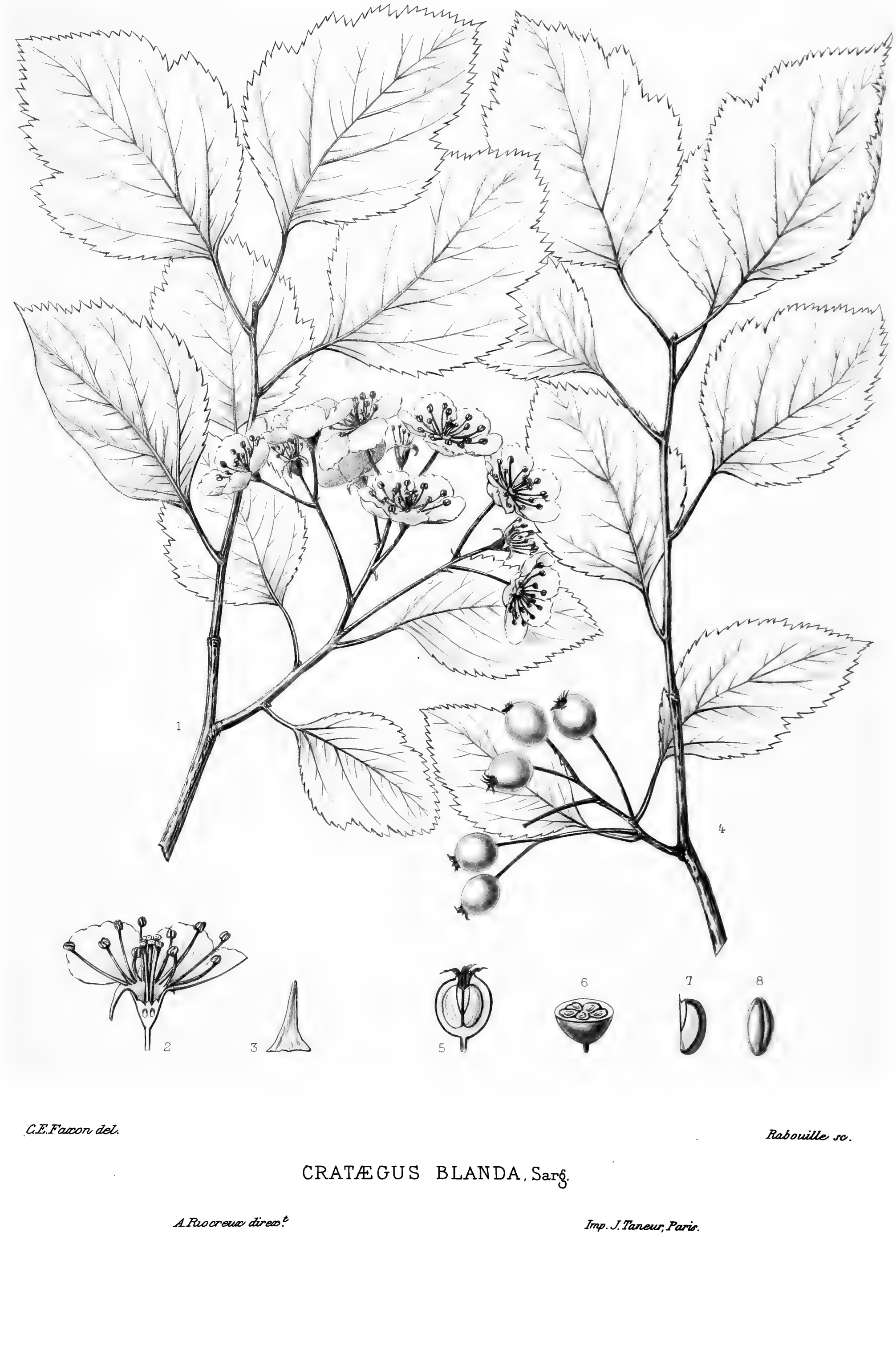
A nearly glabrous unarmed tree, from twenty-five to thirty feet in height, with a tall trunk ten or twelve inches in diameter covered with dark brown or nearly black bark divided by shallow fissures and broken on the surface into small plate-like scales, and stout ascending branches forming a broad open irregular head. The branchlets are slender, nearly straight, glabrous, and marked by large scattered pale lenticels; and when they first appear they are dark orange-green, becoming dull red-brown during their first season, and darker brown the following year. The leaves vary from oval to rhombic, and are acute or acuminate and occasionally slightly lobed toward the apex, broadly cuneate or concave-cuneate at the entire base, and coarsely crenulate-serrate above the middle, with gland-tipped teeth; coated with soft pale hairs when they unfold, they are fully grown when the flowers open about the first of May, and are then membranaceous, dark green and lustrous above and glabrous below, with the exception of large tufts of snow-white tomentum in the axils of the primary veins, from an inch and a half to two inches in length and from an inch to an inch and a half in width, and in the autumn they are subcoriaceous, yellow-green and lustrous on the upper surface and paler on the lower surface, with slender midribs deeply impressed above, and two or three pairs of thin primary veins extending very obliquely toward the apex of the leaf; they are borne on slender petioles slightly winged above, villose at first along the upper side but soon glabrous, and from three quarters of an inch to an inch long. On vigorous leading shoots the leaves are often broadly ovate, full and rounded at the base, more deeply lobed above the middle, from two inches to two inches and a half in length, and from an inch and a half to two inches in width. The stipules are linear-lanceolate, entire, from one third to one quarter of an inch long, and caducous. The flowers, which are an inch in diameter, are borne on slender elongated pedicels, in broad many-flowered compound glabrous corymbs, with linear entire bracts and bractlets. The calyx-tube is broadly obconic and glabrous, and the lobes, which are gradually narrowed from broad bases, are acuminate, entire or obscurely dentate, glabrous, and reflexed after the flowers open. There are twenty stamens with small canary-yellow anthers, and five styles. The fruit ripens about the middle of October, and is produced in many-fruited drooping clusters; it is subglobose or short-oblong, bright orange-red, marked by few large pale dots, a quarter of an inch in diameter, and crowned by the prominent calyx, with a broad deep cavity and spreading lobes which are usually deciduous before the fruit ripens; the flesh is thin, yellow, dry, and mealy. The five nutlets are thin, deeply grooved on the back, pale brown, and three quarters of an inch in length.

Cratægus blanda was discovered in April, 1901, by W. M. Canby, B. F. Bush, and C. S. Sargent, growing on dry uplands and low rolling hills near Fulton on the Red River in southern Arkansas.

EXPLANATION OF THE PLATE.

PLATE DCCII. CRATÆGUS BLANDA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Vertical section of a fruit, enlarged.
6. Cross section of a fruit, enlarged.
7. A nutlet, side view, enlarged.
8. A nutlet, rear view, enlarged.



C.E. Faxon del.

Rabouille sc.

CRATÆGUS BLANDA, Sarg.

A. Riocreux direx.t

Imp. J. Taneur, Paris.

CRATÆGUS NITIDA.

Haw.

STAMENS 15 to 20; anthers yellow. Leaves lanceolate to oblong-obovate, acuminate, coriaceous, dark green, and lustrous.

Cratægus nitida, Sargent, *Bot. Gazette*, xxxi. 231 (1901). — Britton, *Man.* 520.

Cratægus viridis, Sargent, *Silva N. Am.* iv. 109 (in part) (not Linnæus) (1892).

Cratægus viridis, var. **nitida**, Britton & Brown, *Ill. Fl.* ii. 242 (1897).

A nearly glabrous tree, often thirty feet in height, with a tall straight trunk sometimes eighteen inches in diameter covered with close dark bark broken into thick plate-like scales, and stout spreading lower branches and erect upper branches forming a broad open rather irregular head. The branchlets are slender, nearly straight, marked by small pale lenticels, and are unarmed or armed with occasional straight thin bright chestnut-brown lustrous spines from an inch to an inch and a half in length; during their first and second seasons they are bright orange-brown and lustrous, becoming pale reddish brown during their third year, and ultimately ashy gray. The leaves vary from lanceolate to oblong-obovate, and are acuminate, abruptly or gradually narrowed and cuneate at the entire base, coarsely serrate above, with straight or incurved glandular teeth, and often more or less divided into two or three pairs of broad acute lobes; when they unfold they are membranaceous, slightly villose along the upper side of the midribs, with scattered pale caducous hairs, and dark red; soon becoming green and lustrous, at maturity they are thick and coriaceous, dark green and very lustrous on the upper surface, pale and dull on the lower surface, from two to three inches long and from an inch to an inch and a half wide, with prominent midribs usually red on the lower side and few thin prominent primary veins slightly impressed above and generally running to the points of the lobes; they are borne on stout grooved glandular petioles which are more or less winged above, villose while young on the upper side, and from one half to three quarters of an inch in length. On vigorous leading shoots the leaves are frequently five inches long and two and a half inches wide, and more deeply lobed than the leaves of fertile branchlets, with lunate, stipitate, coarsely glandular-serrate stipules occasionally half an inch in length. The flowers, which open early in May when the leaves are nearly fully grown and are about three quarters of an inch in diameter, are borne on slender elongated pedicels in broad compound very thin-branched many-flowered corymbs, with minute linear bracts and bractlets. The calyx-tube is narrowly obconic, and the lobes are narrow, elongated, acuminate, entire or sparingly and irregularly glandular-serrate, and reflexed after the flowers open. There are from fifteen to twenty stamens with slender pale yellow anthers, and from two to five styles. The fruit ripens at the end of October, and hangs on slender elongated pedicels, in many-fruited drooping clusters; it is oblong, full and rounded at the ends, dull brick red, pruinose, with a slight glaucous bloom, marked by small dark dots, from one half to five eighths of an inch in length and about one third of an inch in thickness; the calyx-cavity is deep and narrow, and the lobes, which are only slightly enlarged, are dark red at the base on the upper side, usually erect and often deciduous before the fruit ripens; the flesh is thick, yellow, dry, and mealy. The nutlets, which vary from two to five in number, are rounded and ridged on the back, with low broad rounded ridges, light-colored, and a quarter of an inch in length.

Cratægus nitida is a common tree in the woods which cover the higher parts of the bottoms of the Mississippi River in Illinois opposite the city of St. Louis, where it was first collected in June,

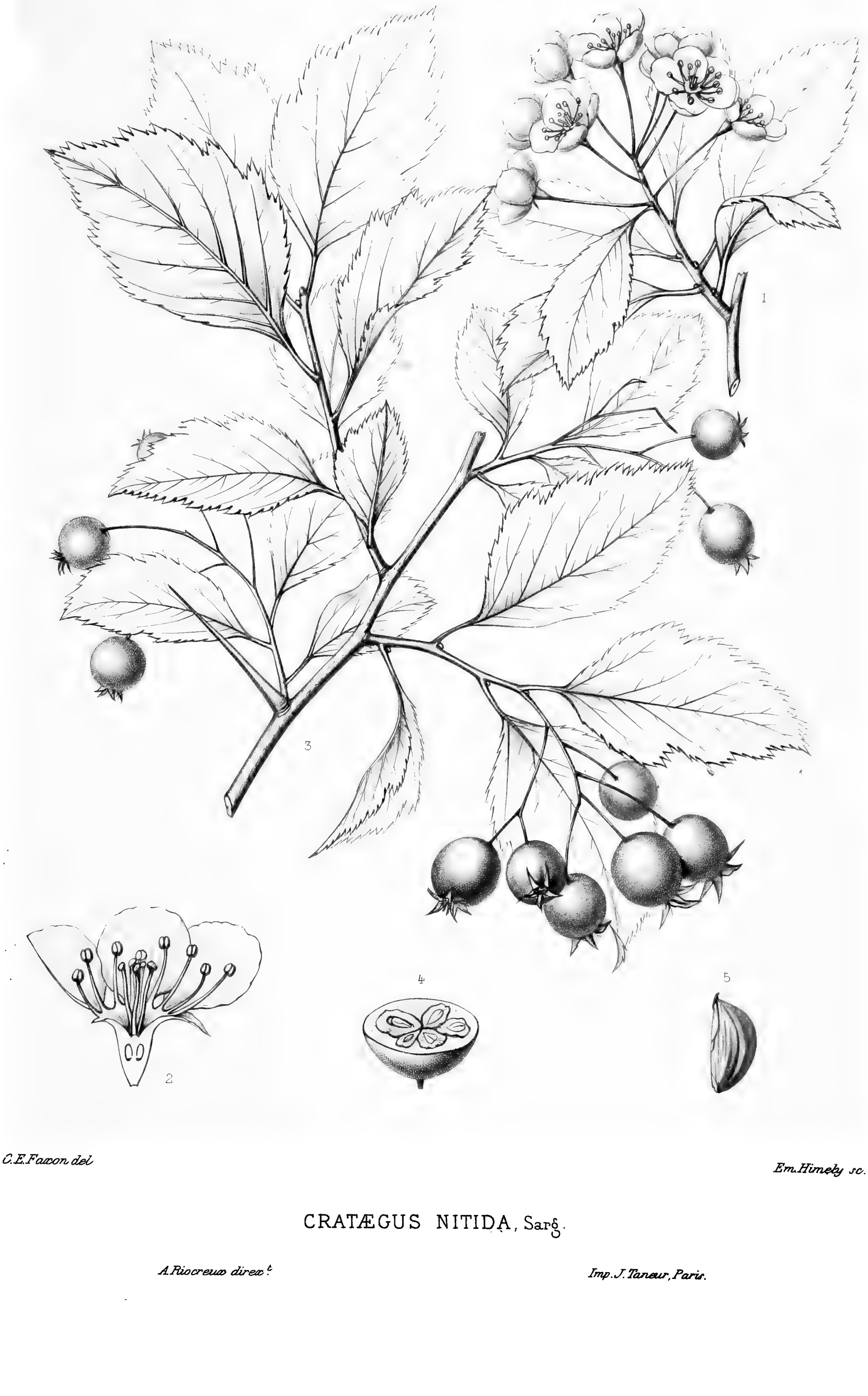
1881, by Mr. G. W. Letterman, by whom seeds were sent in 1883 to the Arnold Arboretum, where this tree is now fully established.

[1] In the Arnold Arboretum the flowers of *Cratægus nitida* open during the first week in June, and the fruit ripens toward the end of October, and falls gradually. At this season of the year it is a handsome object, the large leaves of the long vigorous shoots having gradually turned to a rich orange-yellow color through shades of bronze and orange-red, while the leaves on the shoots of lateral branchlets are still green and very lustrous, and make a beautiful contrast with the abundant but rather dull-colored fruits.

EXPLANATION OF THE PLATE.

PLATE DCCIII. CRATÆGUS NITIDA.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A fruiting branch, natural size.
4. Cross section of a fruit, enlarged.
5. A nutlet, enlarged



C.E. Faxon del

Em. Himely sc.

CRATÆGUS NITIDA, Sarg.

A. Riocreux direx.t

Imp. J. Taneur, Paris.

CRATÆGUS ATRORUBENS.

Red Haw.

STAMENS 20. Leaves ovate, acute, membranaceous.

Cratægus atrorubens, Ashe, *Jour. Elisha Mitchell Sci. Soc.* xvi. pt. ii. 78 (1900).

A tree, sometimes thirty feet in height, with a tall trunk from twelve to eighteen inches in diameter covered with dark red-brown scaly bark, and comparatively thin erect and spreading branches forming a compact rather narrow head. The branchlets are slender, nearly straight, marked by occasional oblong dark lenticels, and usually unarmed; dark green and more or less tinged with red when they first appear, during their first season they become dark chestnut-brown and very lustrous, and bright reddish brown in their second year. The leaves are ovate, acute, usually full and rounded but sometimes broadly cuneate or truncate at the entire base, coarsely and usually doubly serrate, and often divided into two or three pairs of short acute lobes; about half grown when the flowers open late in April or early in May, they are then slightly roughened above by short scattered white hairs, and are furnished below with conspicuous tufts of pale tomentum in the axils of the principal veins; and at maturity they are very thin, glabrous, dark dull green and smooth on the upper surface, light yellow-green on the lower surface, and about two inches long and an inch and a half wide, and on leading shoots frequently three inches long and two inches and a half wide, with thin midribs and four or five pairs of slender primary veins only slightly impressed on the upper side; they are borne on slender nearly terete slightly grooved petioles which, more or less densely villose at first, soon become glabrous and vary from an inch to an inch and a half in length. The flowers are about five eighths of an inch in diameter, and are produced on slender elongated villose pedicels, in broad loose compound glabrous or villose corymbs, with oblong-obovate acute minutely glandular-serrate bracts and bractlets. The calyx-tube is narrowly obconic, coated throughout or only at the base with hoary tomentum, and the lobes are short, acute, finely glandular-serrate, villose particularly on the inner surface, and reflexed after the flowers open. There are twenty stamens with slender filaments and small anthers, and four or five styles surrounded at the base by a narrow ring of pale tomentum. The fruit ripens and falls early in October, and is borne in drooping few-fruited clusters; it is subglobose or short-oblong, full and rounded at the ends, and dark red; the calyx-cavity is broad and shallow, and the lobes are spreading and usually disappear before the fruit ripens. The four or five nutlets are thin, rounded, and sometimes obscurely grooved on the back, and about three sixteenths of an inch in length.

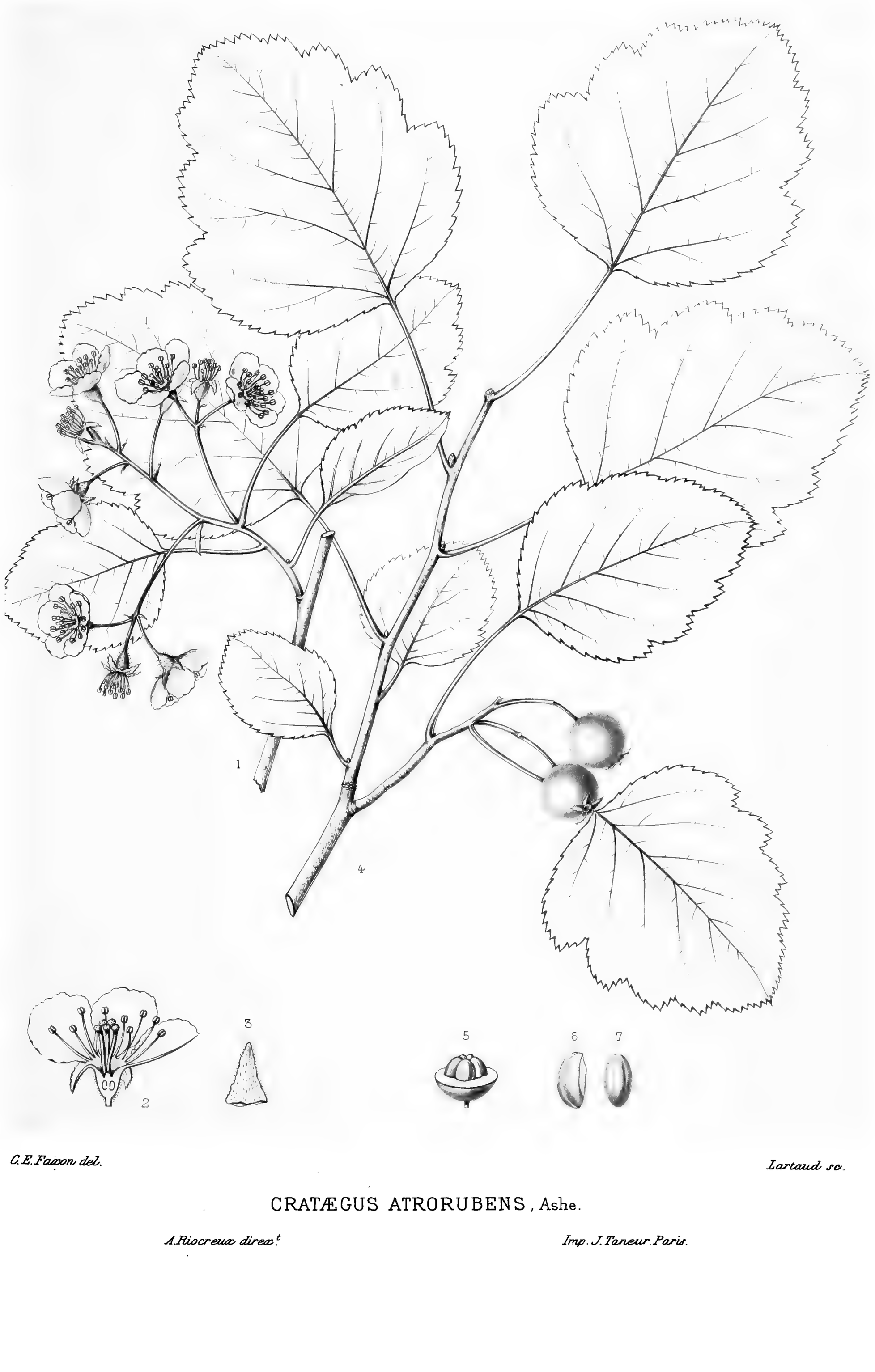
Cratægus atrorubens inhabits the rich bottom-lands of the Mississippi River in East St. Louis, Illinois,[1] where it is not common, and where it was first collected in 1882 by Mr. G. W. Letterman.

[1] *Cratægus atrorubens* was described by Mr. Ashe as growing in St. Louis County, Missouri. This is probably a mistake, as his type specimen was collected by Eggert in East St. Louis, Illinois, and I have not been able to find any specimen of this tree from Missouri.

EXPLANATION OF THE PLATE.

PLATE DCCIV. CRATÆGUS ATRORUBENS.

1. A flowering branch, natural size.
2. Vertical section of a flower, enlarged.
3. A calyx-lobe, enlarged.
4. A fruiting branch, natural size.
5. Cross section of a fruit showing the nutlets, natural size.
6. A nutlet, side view, enlarged.
7. A nutlet, rear view, enlarged.



C.E. Faxon del.

Lartaud sc.

CRATÆGUS ATRORUBENS, Ashe.

A. Riocreux direx.t

Imp. J. Taneur. Paris.

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